APRIL 1953

# FOUNDRY

...WHEREVER METALS ARE CAST

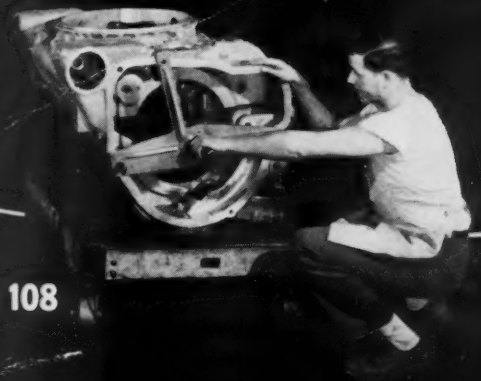
**CALCIUM CARBIDE INJECTION**
*A New Foundry Tool, p. 86*

**ZIRCON IN THE FOUNDRY**
*It Has Various Uses, p. 92*

**WELDING STEEL CASTINGS**
*Use the Right Electrode, p. 96*

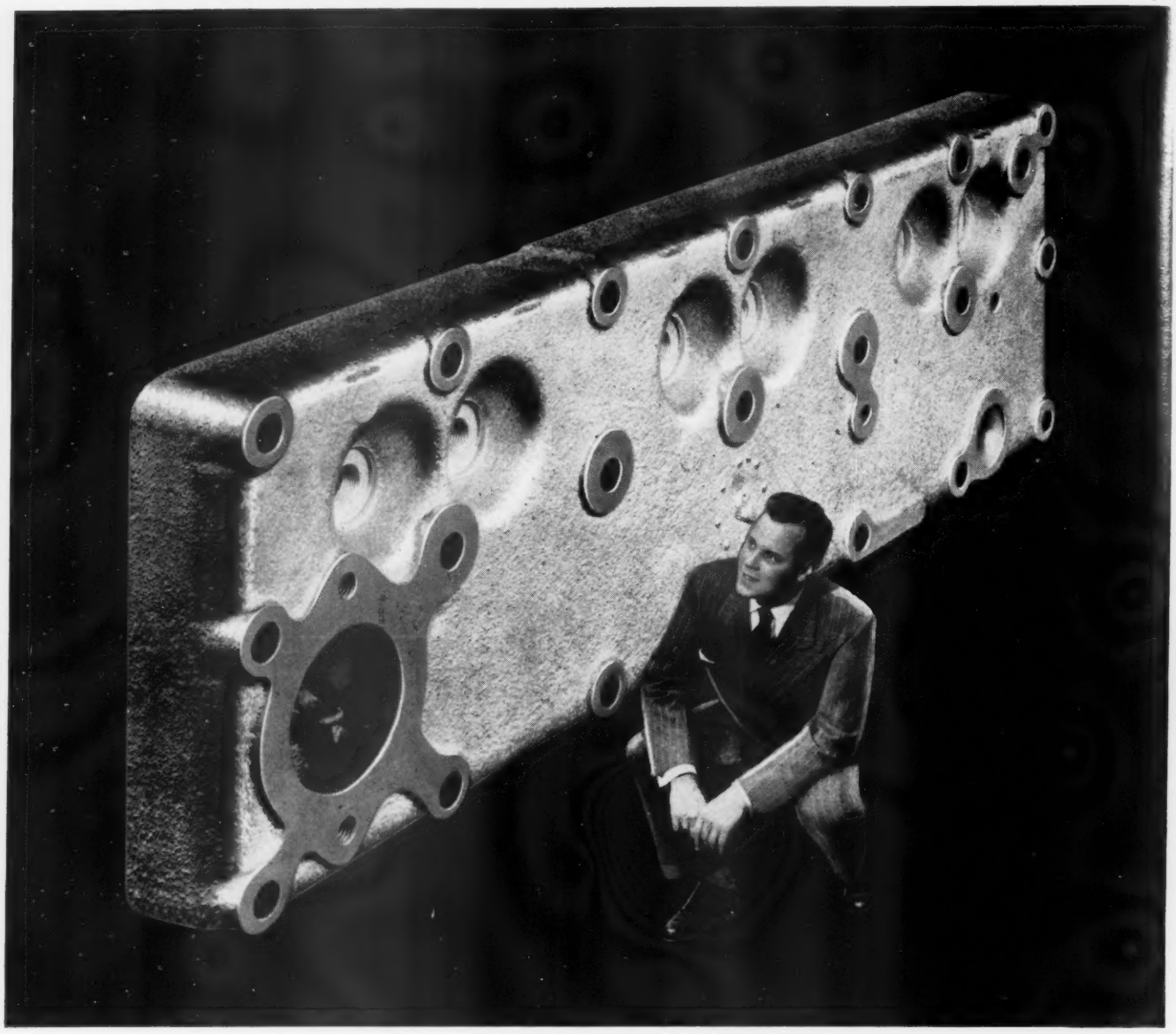
**HIGH-SPEED MOLDING**
*Ramming Large Flasks, p. 98*

**INDUCTION FURNACE MELTING**
*In a Jobbing Foundry, p. 102*



## Making Intricate Aluminum Castings

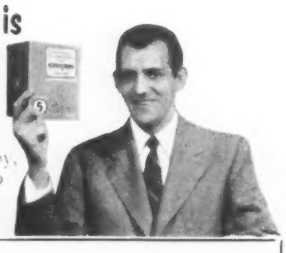
p. 108



# PREMIUM CASTINGS...clean...sound...easy to machine

**This "Tell-All" Booklet is FREE!**

Write Dept. F 84-32 at Niagara Falls for your copy, or call the FERROCARBO Distributor nearest you.



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Your customer wants castings that are easy to machine. When *you* deoxidize your gray iron with FERROCARBO in patented briquette form, *he* can machine up to 35% more castings per tool, before resharpening. You can better guarantee him castings that are clean, sound, free of segregations and inclusions with more resistance to wear and heat shock.

600 leading foundries are now producing *premium* castings—both gray iron and malleable—by deoxidixing with FERROCARBO patented briquettes. Are you among them?

# FERROCARBO
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DETROIT

# 60% longer service life from Nickel iron pots

In addition to producing 80 sizes of melting pots, C. H. MILLES FOUNDRY COMPANY devotes a large portion of its production to metal ingot molds.

A service life of 100 days is good for a plain cast iron melting pot.

But C. H. MILLES FOUNDRY COMPANY of Chicago, Ill., wanted to provide even longer life in the pots they cast.

So they experimented and found that cast iron containing 1.00 to 1.25% nickel would give longer life.

In fact, a typical comparison gave a life span of 160 days for the nickel iron to 100 days for plain iron—an increase of 60%!

Melting pots and ingot molds such as are shown here are typical of the nickel cast iron parts used in elevated temperature applications. At temperatures up to 1300°F. nickel alloyed cast irons maintain a higher proportion of their room temperature strength and hardness, and show less growth and scaling, than unalloyed irons. For applications involving temperatures as high as 1500°F. the austenitic Ni-Resist® compositions are recommended.

At the present time, nickel is available for the production of nickel cast irons and other alloys containing nickel, for end uses in defense and defense supporting industries. The remainder of the supply is available for some civilian applications and governmental stockpiling.

EMBLEM OF INCO SERVICE

**The International Nickel Company, Inc.**
**Dept. 20, 67 Wall Street, New York 5, N. Y.**

Please send me booklet entitled, "Guide to the Selection of Engineering Cast Irons."

Name _____ Title _____

Company _____

Address _____

City _____ State _____

## THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

# if yours is an iron foundry...

# and your sand additives cost you more than

## $1.00 per ton of castings produced

## *you're wasting money!*

The above is quite a serious claim, but we can prove it! First, by establishing the fact that the sand required to produce a ton of castings can be properly prepared with a dollar's worth of CROWN HILL SEACOAL, FEDERAL GREEN BOND BENTONITE and FEDERAL SAND STABILIZER and, secondly, that the use of these three additives produces thoroughly satisfactory results.

The first part can be proved by explaining that at a prominent automotive production foundry, a thorough study of sand preparation costs has been made, using the above three additives. This study proves that the additives for this method of sand preparation cost *less than one dollar per ton of castings produced!*

Proof of the second statement lies in the fact that an overwhelming majority of iron foundries use this method of sand preparation, and do so because it is an easy and economical way to prepare sand and because excellent castings can be produced in sand thus prepared.

So, if you're using *any other method* of sand preparation—using other materials that cost more and require exacting sand control, why not check into this tried and true method—this economical method of preparing sand. We have a new bulletin that tells all about it—and will be glad to forward a copy. Send for it TODAY!

### CROWN HILL SEACOAL

Produced by FEDERAL at Crown Hill, West Virginia. *High* in volatile combustible material, *low* in sulphur and ash content—basic requirements for a top quality seacoal. Ground or granulated to properly match the sand used.

### FEDERAL GREEN BOND

Mined, processed and guaranteed by FEDERAL and unexcelled in uniformity and ability to develop green and dry strength. Truly the best of the bentonites!

### FEDERAL SAND STABILIZER

A processed cellulose sand additive. Its high combustibility allows sand to expand evenly to eliminate casting defects. It increases sand flowability to provide better ramming conditions. And it attracts moisture to broaden the safe moisture range.

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APRIL 1953

# FOUNDRY

Volume 81—Number 4

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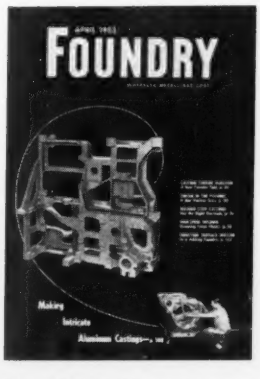
**Business Staff—Page 288**




THE COVER: These are some examples of aluminum castings poured at Acme Aluminum Alloys Inc. See p. 108

## SPECIAL ARTICLES

**Editorial** ..... 85

**Calcium Carbide Injection** ..... 86
By HARVEY E. HENDERSON and PHILIP M. HULME

**Zircon and Its Foundry Applications** ..... 92
By W. M. PETERSON

**Cleaning and Welding Steel Castings (Part III)** ..... 96
By JOHN HOWE HALL

**High-Speed Molding Is Done Automatically** ..... 98
By WILLIAM G. GUDE

**Induction Melting in a Nonferrous Jobbing Foundry** ..... 102
By VAUGHN C. REID

**Making Intricate Aluminum Castings** ..... 108
By ROBERT H. HERRMANN

**Non-Ferrous Founders' Society Celebrates 10th Year** ..... 114
By JAMES W. WOLFE

**Man-to-Man on the Molder's Bench** ..... 136
By RALPH L. LEE

**Chicago Is Host to AFS Convention** ..... 140

**Conferences:**

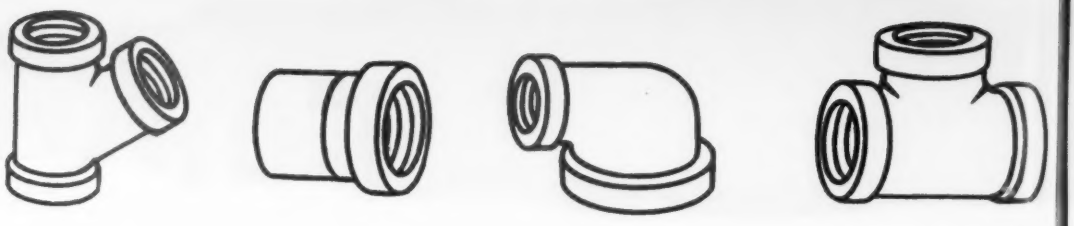
**Southeastern Regional** ..... 151
**California Regional** ..... 167
**Illinois University** ..... 190
**Wisconsin Regional** ..... 196
**Foundry Facings Manufacturers** ..... 241

## NEWS FEATURES

**Around the Country** ..... 146
**Calendar of Meetings** ..... 138
**Foundry Group Activities** ..... 172
**Industry Briefs** ..... 156
**Late Foundry News** ..... 33
**Men of Industry** ..... 122
**News Views** ..... 170
**Obituary** ..... 158
**Statistics** ..... 133

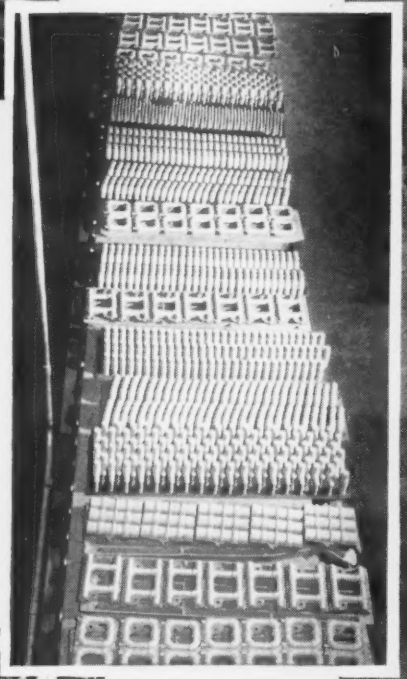
## DEPARTMENTS

**ABC of Foundry Practice** ..... 217
**Adventures of Bill** By PAT DWYER ..... 206
**Advertisers' Index** ..... 288
**Data Sheet** ..... 163
**Dear Reader** ..... 289
**Foundry Developments** ..... 160
**How To Do It** ..... 200
**Ideas for Foundrymen** ..... 225
**New Equipment and Supplies** ..... 222
**Questions and Answers** ..... 116
**Readers' Comment** ..... 82
**Trade Publications** ..... 257
**With the Editors** ..... 10

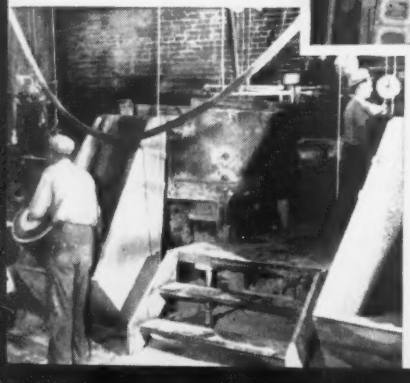


# GRABLER MFG. CO

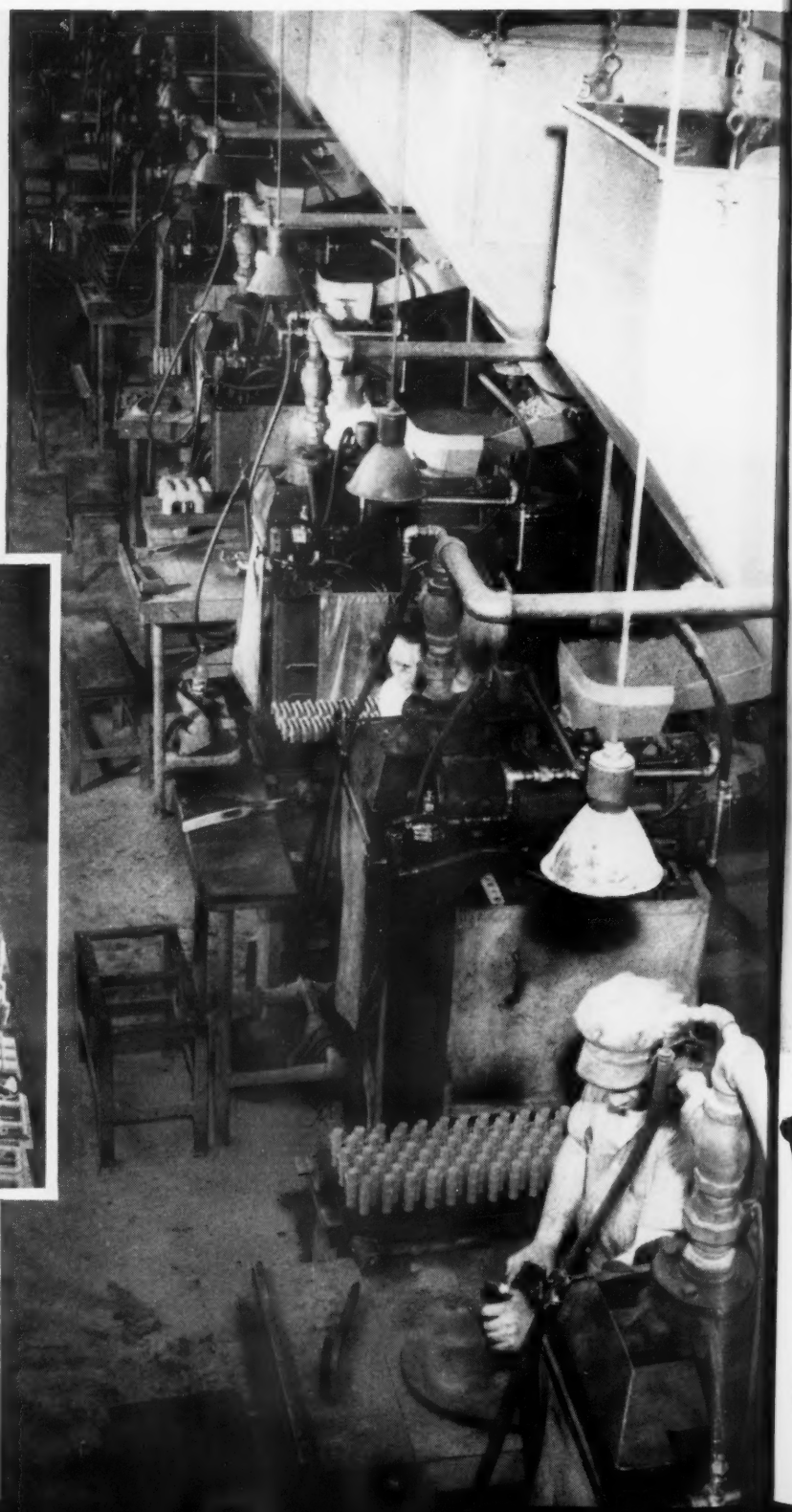
Every five seconds a core goes on the dryer. Speed like this demands a mixture with maximum workability and flowability...and one that won't hang-up in the hoppers. LINOIL provides these characteristics.



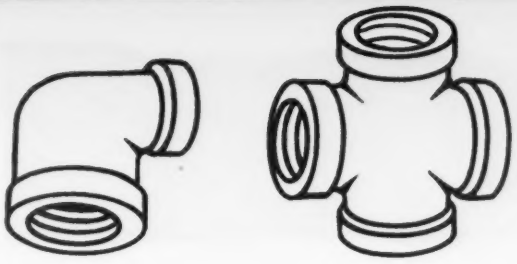
Cores just released from the continuous type tower oven represent less than ½ hour's production. LINOIL provides high tensile strength for small, delicate sections.



Dual mullers, each with 1000 lb. capacity, keep the 30 core blowers supplied. Mixtures are accurately controlled by metered measurement of LINOIL.



A section of one side of the double row of high-speed blowers in Grabler's core department. Conveyor to oven runs down the center... is 126 feet long. This means a long "ride" for cores, calls for high green strength.



# Specifies trouble-free LINOIL

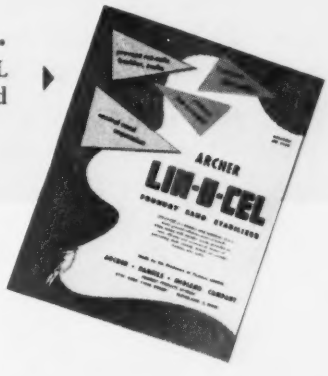
## A "FITTING" OIL FOR A JET-ACTION CORE LINE!

115 tons of fittings a day are poured in the fully-automatic, electronically-controlled molding floor at Grabler Mfg. Company, Cleveland, Ohio.

This means the core room can't take time out for trouble . . . 30 blowers produce top quality cores at the terrific rate of 135,000 per day. Workability, strength, freedom from stickiness are the basic requirements of the mixture in this high-speed core line. They have found that LINOIL answers these demands!

LINOIL can be the answer to your problems, too. If you are seeking better performance, faster production, higher quality, why not call an ADM representative to survey your requirements? Call the LINOIL man in your locality, or write direct for more information.

**NEW PRODUCT IS GOOD NEWS TO FOUNDRYMEN...** makes molding sand foolproof. ARCHER LIN-O-CEL improves flowability and prevents rat-tails, buckles and scabs. Write for a copy of bulletin giving details.



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Use a Stearns Lifting Magnet for: picking up pig iron, rails, scrap, bulky castings, sprues, gates, runners, hoppers, buckets, and many other uses. There are Stearns Magnetic Foundry Units for sand, grinding and separation, etc. Information sent upon request.

1004

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# 5 ways you save costs with Plaskon resin core binders

**Plaskon Resin Core Binders can bring you savings in time and money on the casting of all metals.**

Here are 5 important qualities that speed production and lower costs:

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Just enough heat to thoroughly dry out the cores is sufficient to set the resin, so that no extra baking is necessary.

**2 Less Rejects—Closer Tolerances:**
During casting, no tars are formed to clog vents and reduce the permeability of the sand. This reduces blows, gas holes and porosity to a minimum and permits the use of finer grain sand, yielding better detail and casting finish.

**3 Lower Shakeout Costs:**
After casting, the binder is sufficiently burned out, so that the sand readily shakes out of the most intricate passageways. Cracks and hot tears are usually eliminated.

**4 Greater Tensile Strength Means Less Core Scrap:**
Cores may be made extremely hard and strong, reducing the need for wires, without losing excellent knockout and collapsibility properties.

**5 Excellent Stability:**
Plaskon resin core binders are supplied in both stable powder and liquid forms, giving the individual foundryman his preference.

To find out how Plaskon foundry resins can save you money, send today for complete technical information. Contact Frederic B. STEVENS, Inc., distributors, or write direct to Plaskon Division, Libbey·Owens·Ford Glass Company, Toledo 6, Ohio.

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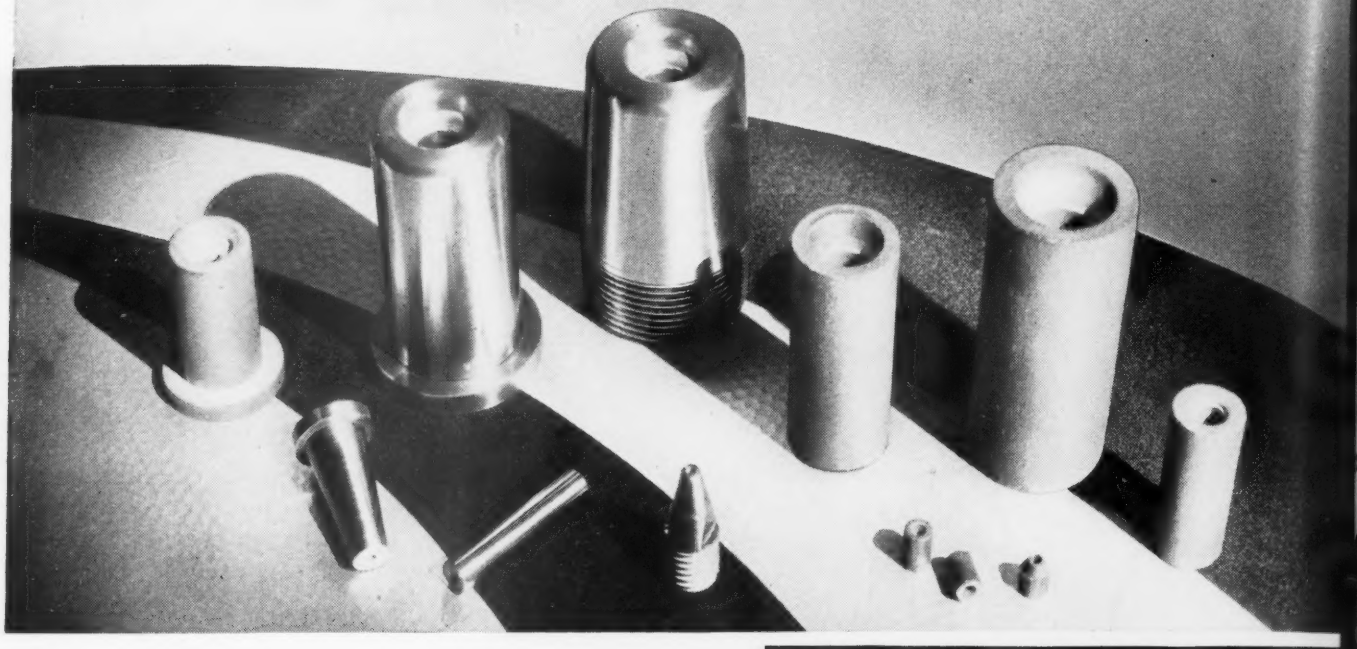
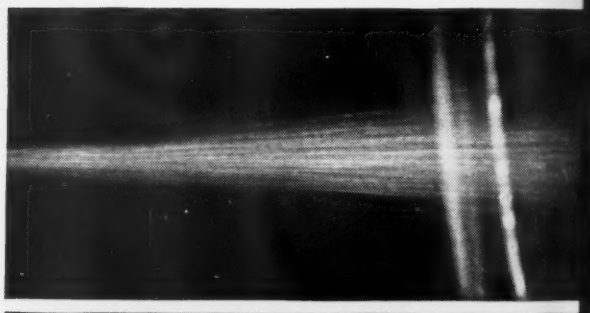
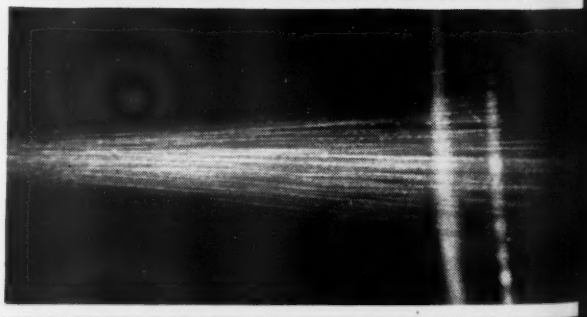
# *You Can Increase Nozzle Life*

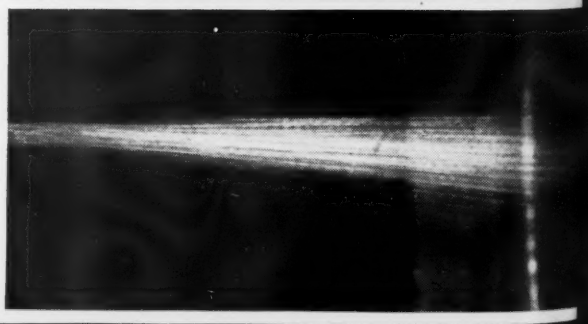




High speed photograph of stream from new iron nozzle — note that stream concentration and abrasive velocity and volume are fair.



Stream from the same nozzle after three hours with silica sand. Outlet opening worn to twice original size — stream concentration poor, abrasive velocity and volume low.



Stream from Norbide Nozzle after 404 hours with sand — outlet diameter worn only 0.032"—hundreds of hours of useful life remain—marked stream concentration—high abrasive velocity and volume.

NORTON WEAR-RESISTANT PRODUCTS

# *Every Time with NORBIDE* Nozzles*

**IF YOU ARE LOOKING FOR** longer nozzle life and more service per dollar cost — then it will pay you to examine the performance of NORBIDE* Nozzles — the most wear-resistant nozzles ever made.

**IF YOU WANT** to decrease air consumption as much as 20% (over cast iron nozzles) —

**IF YOU WANT** to improve blast cleaning efficiency by using nozzles that maintain stream contour and abrasive velocity for a long period of service —

**IF YOU WANT** to do away with costly, time-consuming "down-time" brought about by short nozzle life —

**THEN INQUIRE TODAY** about long-lived NORBIDE Nozzles, made of Norton Boron Carbide — "the hardest material made by man". **Write for informative bulletin and price list No. 543-F.**

**NORTON COMPANY, Worcester 6, Mass.**

*Trade-mark Reg. U. S. Pat. Off.

**NORTON COMPANY · WORCESTER 6, MASS.** NORTON

# A belting choice made by test and proved by time

■ Fourteen years ago the Farrell Cheek Steel Co. of Sandusky, Ohio, ran a belting test on the 570-foot conveyor pictured here. After a long series of tests of many other belts, a length of 24" x 6 ply Imperial Standard Sahara Belting was spliced to a longer piece of competitive belting on the conveyor, which handles steel refuse and hot foundry sand at temperatures from 300° F. upward. Sahara proved so superior that it was chosen for the job. It has since been used exclusively.

## Trouble-Free Service

Imperial's Standard Sahara Belts are built for trouble-free service. Base fabric is tight-woven heavy-duty silver duck, double-stitched to prevent ply separation. Special impregnation preserves and waterproofs the belt, increases its resistance to abrasion, and gives it pliability.

## Job-Designed Belting

Imperial makes belts to meet specific operating conditions—belts that cost less to use because they are designed for the job. Tell us your problem and we'll give you our recommendations. Write for Data Sheet 51-9.

**Imperial**
**BELTING CO.**
*1755 S. Kilbourn Ave.*
*Chicago 23, Ill.*

**Engineered Belting**
**The Right Belt for Each Job**


# With the EDITORS

**COMPLIMENTS:** Readers everywhere have been offering compliments on the special Cleveland Ford Foundry feature in the March issue. Many have commented especially on the thoroughness of the report, the excellence of photographs and layouts, and attractiveness of the cover. Thanks so much for the kind words—and we are pleased that you liked it.

—o—

**Spring in Japan:** A note written Mar. 2 by our friend Shin-ichi Kawata, head of a nonferrous foundry society in Tokyo, tells that spring has come to Japan, with daytime temperature around 70°. Condition of the nonferrous foundries in Japan is not good, with demand for castings light and raw material costs high. Most of these foundries use copper alloy scrap, and the industry now is faced with a shortage of that material. I gather that the foundrymen are not fighting for adequate prices which will cover cost of production and a fair profit. It should be mentioned that the society will celebrate its third anniversary "the bottom of April."

—o—

**A Job Well Done:** Representatives of the four ferrous foundry trade groups—the Alloy Castings Institute, Gray Iron Founders' Society, Malleable Founders' Society and Steel Founders' Society of America — gathered at the Athletic Club, Cleveland, on Feb. 26, for a dinner honoring A. J. McDonald. Special tribute was paid Mr. McDonald for his service to the ferrous foundry industry during the recent mobilization program as chief of the Castings Section, Iron and Steel Division, National Production Authority. The groups presented him with a beautiful desk pen set, suitably engraved. Al should take a great deal of satisfaction in this tribute to a job well done.

Those in attendance are shown in the accompanying illustration. Reading from left to right: Henry J. Trenkamp, GIFS; Donald H. Workman, GIFS; E. L. Roth, GIFS; Frank G. Steinebach, FOUNDRY; C. F. Barchfeld, SFSA; H. L. Edinger, GIFS; A. J. McDonald; Lowell D. Ryan, MFS; A. F. Jackson, MFS; C. W. Briggs, SFSA; F. Kermit Donaldson, SFSA; E. A. Schoefer, ACI; Guy A. Baker, ACI; Chauncey Belknap, SFSA.

—o—

**Orchids for Dreher:** During the sixth annual Foundry Educational Foundation Conference, held in Cleveland Mar. 11 and 12, Anthony Haswell, one of the small group of farseeing foundrymen who organized the FEF, paid a fine tribute to George Dreher for his leadership in the FEF movement over the past six years. The part of Tony's statement which perhaps best described the particular talents George brought to this organizational job, was as follows: "It took a rather rare person to understand both the molder and the Ph.D.'s." Hazel Patterson and Chuck Esgar handled the presentation of some fine luggage to George and Mrs. Dreher. A report of the conference will be presented in the May issue.

—o—

**A New Society:** Progress continues in the formation of a new trade group to be known as the Investment Casting Institute. I sat in on an all-day meeting in New York Feb. 27, and listened to a general discussion of the proposed by-laws. K. M. Bartlett, Thompson Products Inc., is chairman of the committee handling organizational details.

—o—

**A New Trade School:** Foundrymen in the Cleveland area are quite pleased that the Cleveland Board of Education has voted to build a new $2.5 million Trade School. While the city fathers are objecting to the site

(*Concluded on page* 12)

# INTERESTED IN *Reducing* SCRAP LOSS?

## try Harbison-Walker's

# Refractory Strainer Cores

Many foundries have reduced scrap loss and improved their castings by adopting Harbison-Walker Refractory Strainer Cores. Made of a hard, strong ceramic material, moulded under pressure and kiln-fired at a high temperature, they are uniformly accurate in shape and size, cleanly formed, non-spalling, erosion-resistant and economical.

With equivalent gate diameters ranging from ⅝-inch to 1½-inch, Harbison-Walker Refractory Strainer Cores in seven sizes provide for all normal requirements.

Cleaner castings are made when Harbison-Walker Refractory Strainer Cores are used; chipping, welding and grinding are substantially reduced; scrap losses are decreased; production is increased and labor costs are reduced.

Now available for prompt shipment, Harbison-Walker Refractory Strainer Cores are packed in sturdy cartons of a size and shape most convenient for the moulder. Write for bulletin describing this modern aid to economical foundry operation.

**HARBISON-WALKER REFRACTORIES COMPANY** AND SUBSIDIARIES

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General Offices: Pittsburgh 22, Pa.

"Just like a grinding wheel!"

SIMONDS ABRASIVE CO.

Grinding Wheels

He's right! A grinding wheel's cutting particles *are* embedded like currants in a bun. But there's more than that to Simonds wheels. The cutting particles are scientifically processed by Simonds. They're accurately sized. They're evenly distributed. Their spacing in the wheel bond is controlled for maximum cutting efficiency on specific grinding jobs. This controlled quality assures *you* of superior performance each time *you* order Simonds grinding wheels, mounted wheels, segments or polishing grain. Write for data book and name of your distributor.

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co, Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

(*Concluded from page* 10)

which has been selected, those interested feel that the city is a step nearer to this much needed training center. The Northeastern Ohio Chapter of AFS can take considerable credit for the present accomplishment. A chapter committee, with J. H. Tressler, Hickman, Williams & Co., as chairman, and Henry J. Trenkamp, Ohio Foundry Co., and F. Ray Fleig, Smith Facing & Supply Co., as active members, has worked hard and long on the project, including a successful campaign for approval of a bond issue several years ago.

—o—

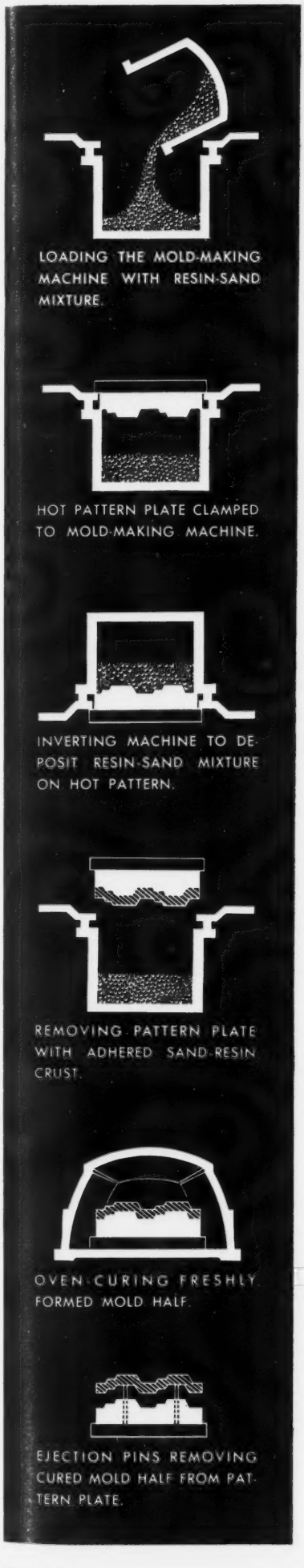
**Greetings to Bettie:** We do have cover-to-cover readers of FOUNDRY. For example, take our friend Jacques LeCovec, Regie Nationale des Usines Renault, Paris. Near the end of the

year Bettie Thompson of the circulation department sent him a classification form to determine his foundry industry connection. When the form came back, Mr. LeCovec included a photo of the Eiffel Tower on one side and a special holiday greeting together with a reproduction of the Renault car, on the other. We have reproduced the greeting. The photo of Bettie is taken from page 300 of the December, 1952 issue. So you see, Jacques had to look through the entire book before he found the FOUNDRY gal who asked so many questions.

—o—

**The May Issue:** Did you notice the insert in the March issue announcing the special series of six articles on "Progress in the Foundry Industry" which will be presented in the May, Pre-convention issue? This material has been received and the editors believe you will find it quite interesting and informative. In addition, that issue will contain the complete technical program for the 57th annual convention of the American Foundrymen's Society, to be held in Chicago, May 4 to 8; a list of members of the Chicago Chapter's convention committees, and plans for plant visitation, ladies entertainment and other special features. It should be an excellent issue.

F.G.S.


LOADING THE MOLD-MAKING MACHINE WITH RESIN-SAND MIXTURE.
HOT PATTERN PLATE CLAMPED TO MOLD-MAKING MACHINE.
INVERTING MACHINE TO DEPOSIT RESIN-SAND MIXTURE ON HOT PATTERN.
REMOVING PATTERN PLATE WITH ADHERED SAND-RESIN CRUST.
OVEN-CURING FRESHLY FORMED MOLD HALF.
EJECTION PINS REMOVING CURED MOLD HALF FROM PATTERN PLATE.

# How SHELL MOLDING Pays off!

*The shell molding process offers notable economies in both long- and short-run production of ferrous and non-ferrous castings.*

**LONG RUN PRODUCTION.** Shell molds yield castings almost pattern-smooth, with tolerances as close as .003 to .005 inches per inch. This feature greatly reduces finishing costs. Moreover, there is a high percentage of sound, uniform castings, with fewer rejects.

**SHORT RUN PRODUCTION OF COMPLEX SHAPES.** Such castings normally require finishing entirely by hand—at prohibitive cost. Shell molds are made of a resin-sand mixture that is perfectly suited to forming on intricate pattern plates. Shell molds can be stored without deterioration for intermittent production scheduling. They retain their shape until used.

**SELECTION OF PROPER RESINS.** BAKELITE Phenolic Resins are used to bond the fine-grained sands from which the thin, lightweight shell molds are made. Bakelite Company has developed several resins for this process, of which two meet most requirements. One provides resistance to distortion during the initial heat of pouring. The other provides accurate reproduction of intricately-detailed patterns, even those requiring deep draws.

**ENGINEERING GUIDANCE.** Correct use of the bonding resin is important to successful shell molding, for which you may wish to have expert guidance. A good starting point is to consult with Bakelite Company engineers located in principal cities.

*To get the basic story on the shell molding process and the BAKELITE Phenolic Resins developed for it, mail the coupon today!*

**BAKELITE**
TRADE-MARK

**PHENOLIC RESINS FOR SHELL MOLDING**

TRADE MARK

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*A Division of*
*Union Carbide and Carbon Corporation*
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30 East 42nd Street, New York 17, N. Y.
*In Canada:*
Bakelite Company (Canada) Ltd., Belleville, Ont.

BAKELITE COMPANY, Dept. PK-29.
*A Division of Union Carbide and Carbon Corporation*
30 East 42nd Street, New York 17, N. Y.

Please mail me my free copy of the Booklet C-8, "BAKELITE Phenolic Resins for the Shell Molding Process."

*Name*_____ *Title*_____

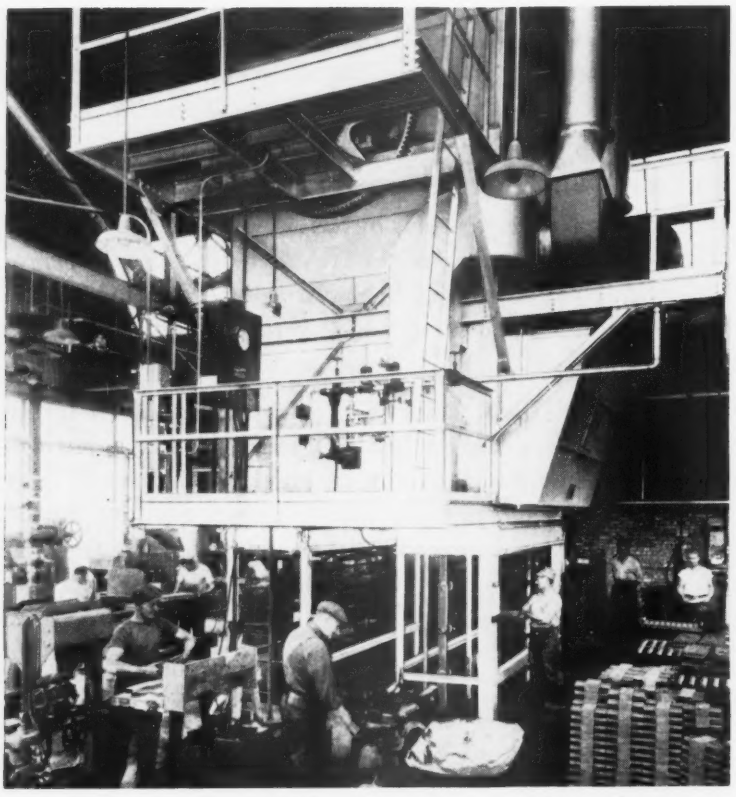
*Company*_____

*Street*_____ *City*_____ *Zone*_____ *State*_____

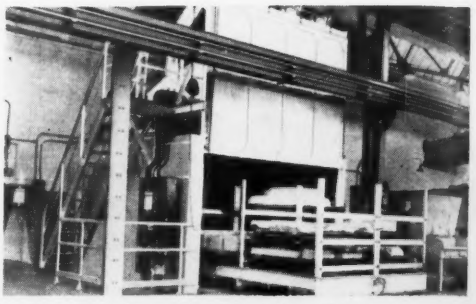
# Repeat orders for

# COLEMAN OVENS

## *prove* outstanding performance

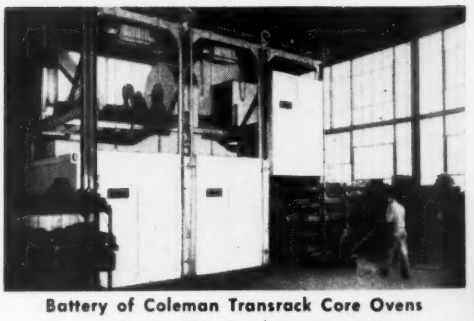


Coleman Tower Oven at Wells Manufacturing Co.



Coleman Car-Type Core Ovens
at Pettibone-Mulliken Co.

Coleman Car-Type Mold Oven
at The Bullard Co.



Battery of Coleman Transrack Core Ovens
at The Crucible Steel Castings Co.

**You should get all the facts concerning the core and mold ovens you expect to install... because the right ovens will increase your production and your profits. Over 80% of Coleman Ovens are "repeat orders" from past customers... proving performance to *complete satisfaction.* Coleman Ovens are the choice of leading firms in every branch of the foundry industry from small shops to large production foundries. You get over 50 years of know-how and experience in every Coleman Oven, so why gamble with inferior designs? Coleman Ovens of proved performance cost no more... and pay for themselves quickly out of savings in fuel, labor and increased production. Get the facts today...**

***WRITE FOR BULLETIN C***

**A COMPLETE RANGE OF TYPES AND SIZES**
**for every core baking and mold drying requirement:**

- Tower Ovens
- Horizontal Conveyor Ovens
- Car-Type Ovens
- Transrack Ovens
- Rolling Drawer Ovens
- Portable Core Ovens
- Portable Mold Dryers

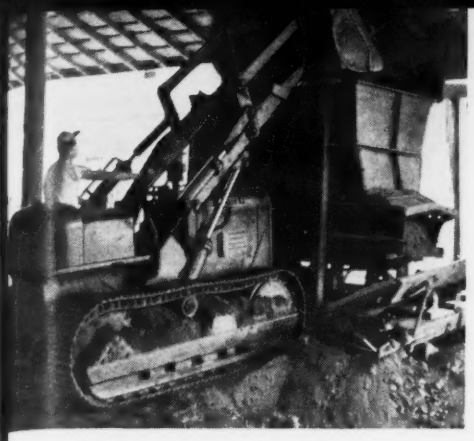
MEMBER FEMA

**THE FOUNDRY EQUIPMENT COMPANY**
1831 COLUMBUS ROAD CLEVELAND 13, OHIO

● *world's oldest and largest foundry oven specialists*

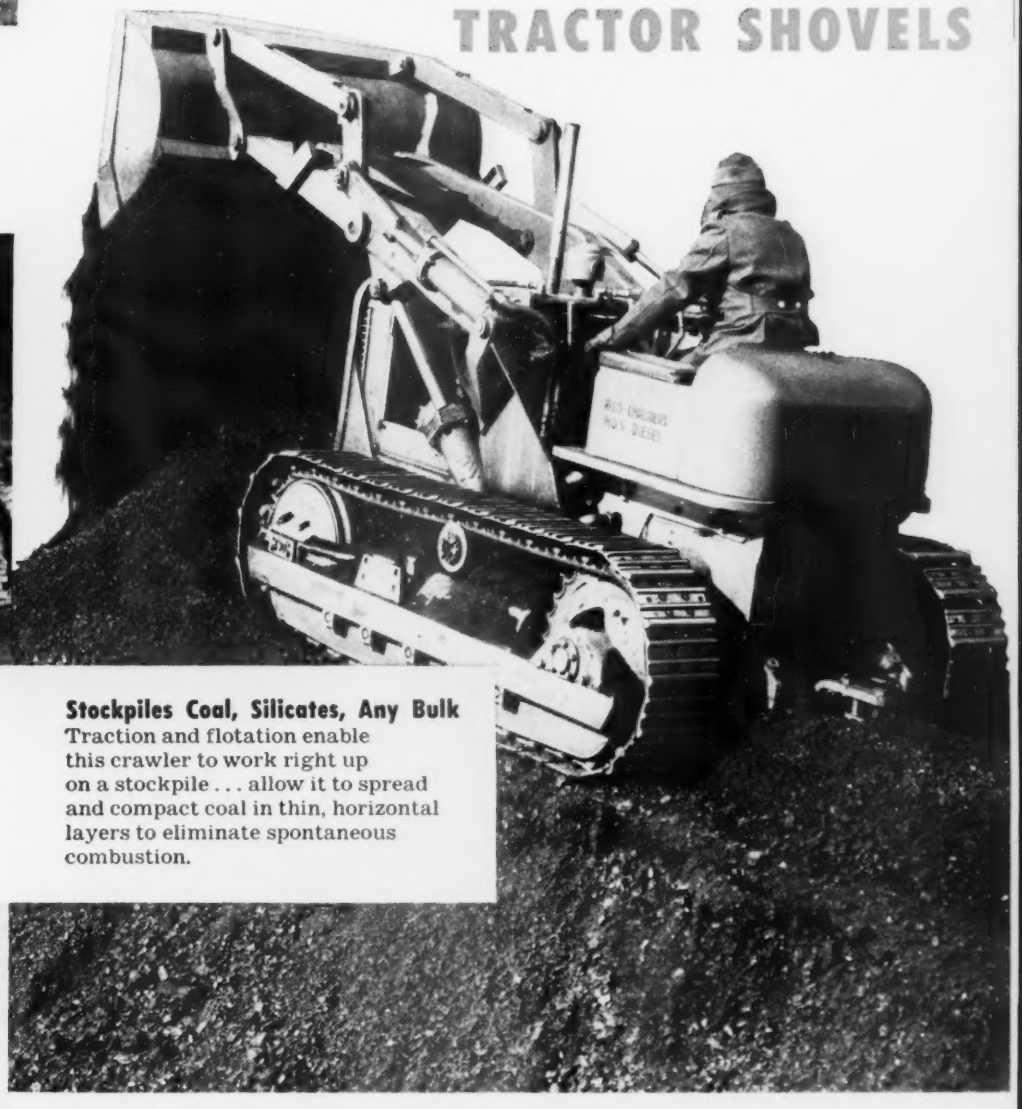
# New Trends in Mechanized Materials Handling

## WITH ALLIS-CHALMERS TRACTOR SHOVELS



**eds Hoppers, Conveyers**
pecial high-speed reverse increases
tput on short runs between stockpile
d hopper. Steel tracks stand up in
llet and other sharp, abrasive
aterial.

**cavates, Loads Trucks**
his busy crawler-mounted shovel
s the power to dig into hard-packed
aterials — and bring it out, a full cubic
rd at a scoop. In handling light
aterials, an interchangeable two-
rd bucket doubles its capacity.



**Stockpiles Coal, Silicates, Any Bulk**
Traction and flotation enable this crawler to work right up on a stockpile . . . allow it to spread and compact coal in thin, horizontal layers to eliminate spontaneous combustion.

**ndles Packaged and Solid Materials**
ith Lift Fork in place of bucket,
e HD-5G skids, carries and stacks
lletized loads weighing up to 4,000 lb.
acking height beneath forks
106 inches.

Crawler tractors — basic machines on earth-moving and construction jobs — are now solving more and more bulk materials-handling problems in industry with hydraulic front-end shovels. And spear-heading this new trend is the Allis-Chalmers HD-5G — thousands of which are now in use in plants of all types. This multi-purpose crawler combines power, traction and maneuverability with a wide selection of hydraulically operated attachments for a variety of material handling jobs.

Get the full story on how crawler tractor power and versatility can help mechanize your tough jobs. Ask your Allis-Chalmers dealer about the HD-5G and these three larger tractors shovels: 2-yd. HD-9G, 3-yd. HD-15G and 4-yd. HD-20G. Light materials buckets range from 2 to 7 cu. yd.

**ALLIS-CHALMERS**
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

*Here are a few of the other jobs the HD-5G and its attachments will handle:*

**Maintains yards and roads with bulldozer or shovel • Clears snow from parking areas • Moves machinery and other heavy materials with Crane Hook attachment • Spots railroad cars at loading docks • Digs trenches for pipe or foundation footings with Trench Hoe attachment**

# TWO 3F SIMPSON MIX-MULLERS®

## help make casting quality live up to the name...

SUPERIOR

***Read what Superior Foundry, Inc., Cleveland, Ohio, has to say about the performance of their two Simpson 3F Mix-Mullers:***

*"Our Quality is the same as our name.* That is our slogan and our two 3F Simpson Mix-Mullers help us produce the high quality castings for which Superior Foundry, Inc., is noted nationally.

. . . Our average variation in moisture in the molding sands is 0.2 of one percent.

. . . The molders and foremen now say that the system sand from the Simpson Mix-Mullers is better than our facing made previously, and that we have eliminated facing on many of the patterns with excellent results in casting finish.

. . . Use of bond in the system sand has been cut 50 percent with no loss in quality".

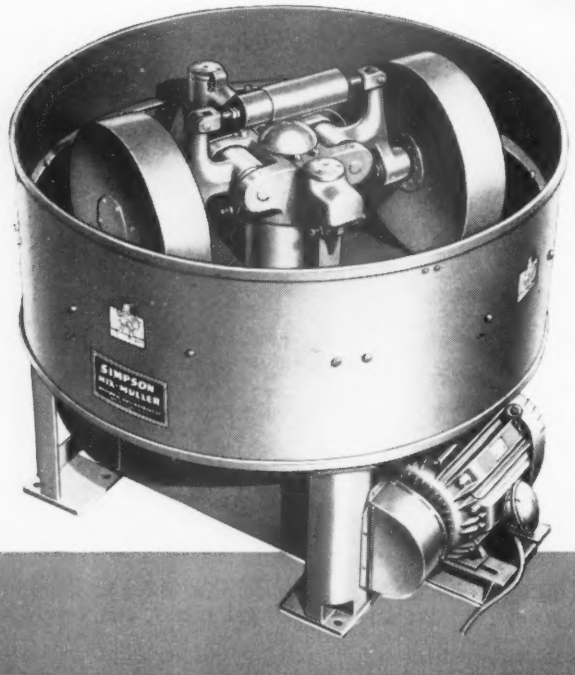
***CLEM SWENCKI***
***Quality Control Director***

*Mr. Clem Swencki*
*Quality Control Director*
*Superior Foundry, Inc.*

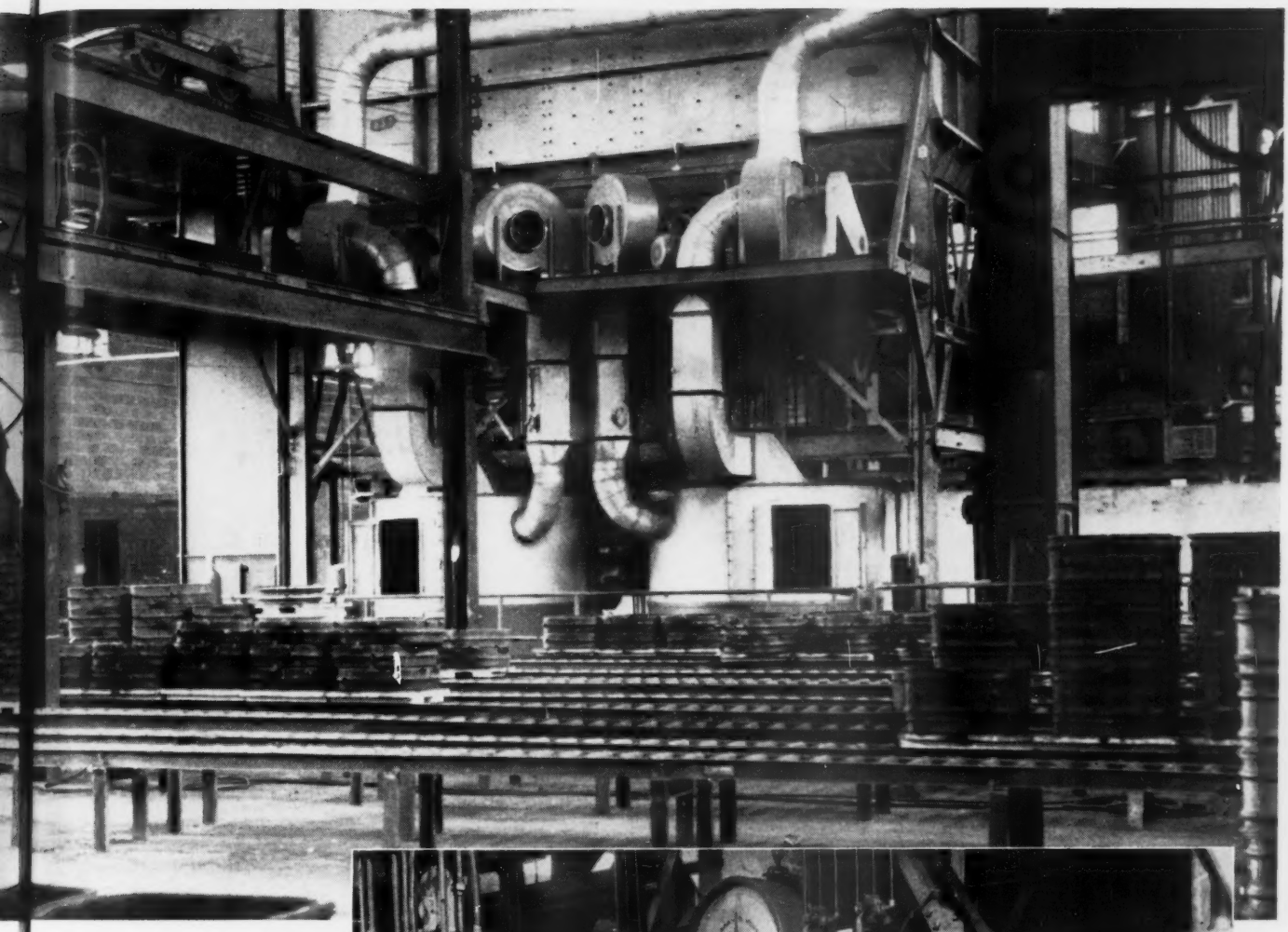
The two 3F units referred to were installed in this progressive Cleveland foundry as a vital part of a new sand preparation system completed within the past year. The two Mix-Mullers prepare 400 to 500 tons of sand in 8 hours, supplying ten heavy molding cope and drag floors.

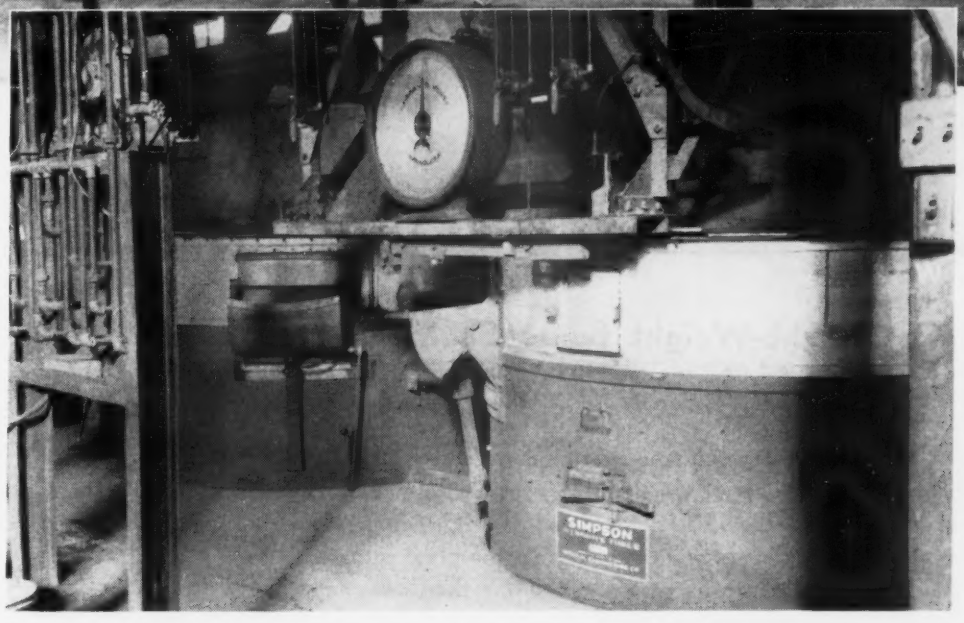
The mixer operator, through the use of well-integrated National equipment, meets the demands for many types of high quality sands required at the same time on the different molding floors.

To sum up Superior's experience with their Mix-Mullers we quote from Mr. William Hampton, Plant Engineer . . . *"Simple in operation, easy for maintenance, fast and dependable, the 3F Simpsons do an excellent job for us."*




**At the left is a close-up of a 3F Simpson Intensive Mix-Muller, showing the sturdy construction, and the adjustable muller design which permits a wide range of sand types to be handled.**






Shown above is a view of the modern sand preparing plant installed at Superior Foundry, Inc., Cleveland, Ohio. Equipment includes two 3F Simpson Mix-Mullers, traveling weigh larry, 200-ton capacity sand storage bin, water meters and cooling hoods . . . all installed by National Engineering Co.

At the right is a close-up of the two 3F Simpson Mix-Mullers and traveling weigh larry.

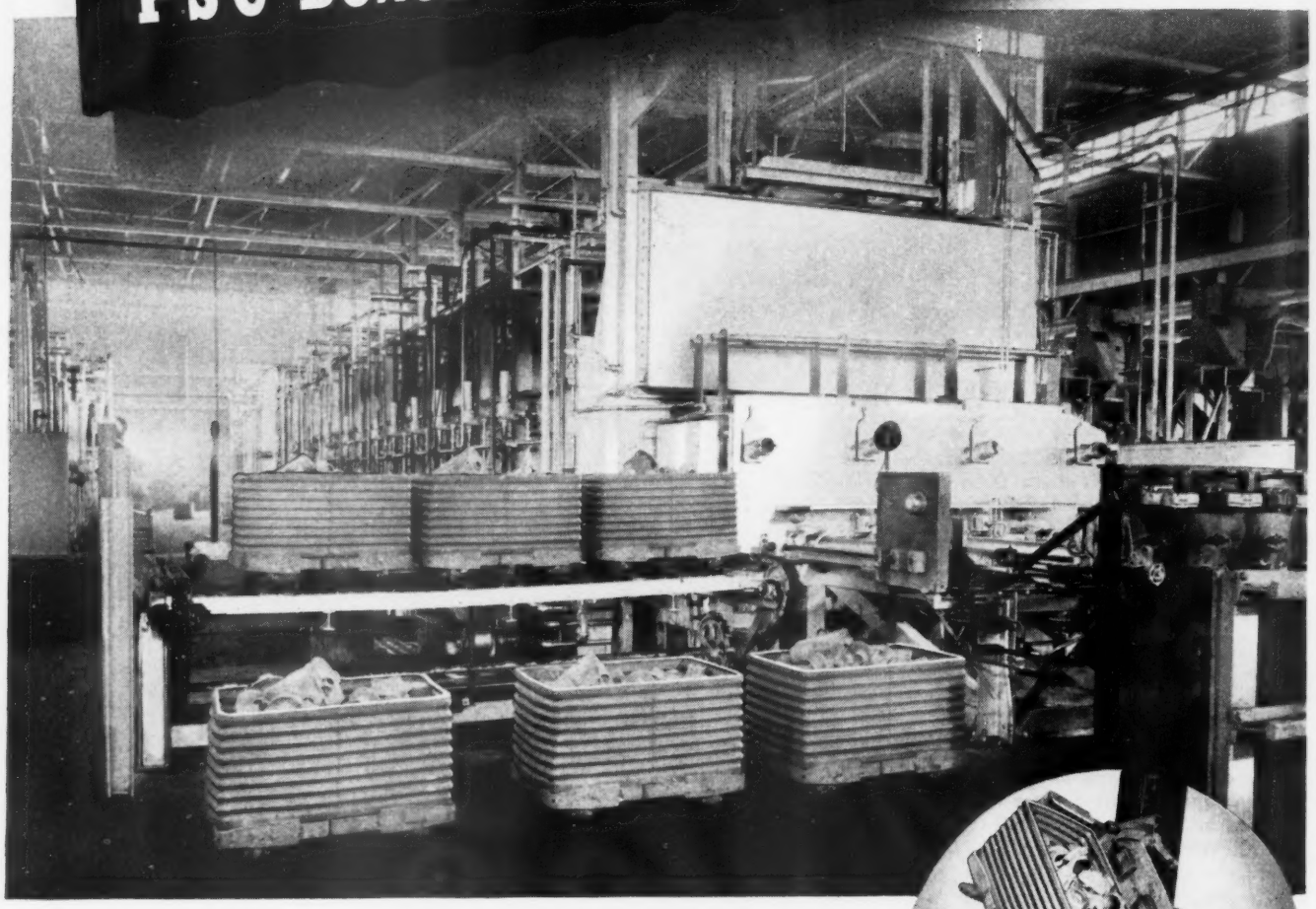
*Let our experienced engineering staff help you increase production, improve casting quality, and reduce costs. Write for further information.*

**National Engineering Company**
(Not Inc.)
**608 Machinery Hall Bldg. • Chicago 6, Illinois**

**SIMPSON**
*Intensive*
**MIX-MULLERS**

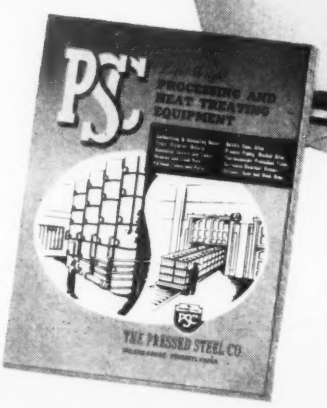
Manufacturers and Selling Agents: For Continental European Countries — George Fisher, Ltd., Schaffhausen, Switzerland; for British Possessions — August's Limited, Halifax, England; for Canada — Dominion Engineering Co., Ltd., Montreal; for Australia and New Zealand — Gibson, Battle & Co., Pty., Ltd., Sydney, for Argentina, Brazil and Uruguay — Equipamentos Industriais EISA Ltda., Sao Paulo, Brazil; for Mexico — CASCO ,S. De R.L., Mexico, D.F.

# 'Albion Malleable Iron' Chooses PSC Boxes for Huge Furnace



## PSC Light-Weight Boxes Speed 800-lb. Loads for 120-ft. Long "Surface" Furnace

The above annealing furnace of Albion Malleable Iron Co., Albion, Mich., is one of the longest ever built by Surface Combustion Corp. It's 120 ft. long, and 11½ ft. wide inside. To effect ready flow of work to and from the great furnace, PSC "light weight" boxes were adopted and then designed for use with both roller trays and lift trucks, as pictured. As pioneers of light-weight, sheet alloy, heat-treating containers, we make available to you a wealth of production know-how. PSC furnishes equipment in any size and for any product. Send blue prints or write as to your needs.




*Send for Heat-Treating Catalog 52*

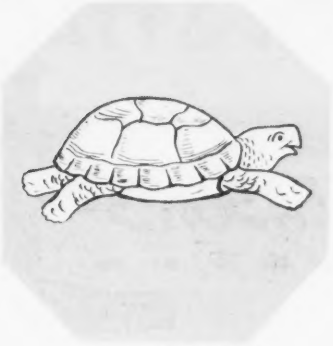
**Complete reference on equipment for every purpose**

**THE PRESSED STEEL COMPANY**
of WILKES-BARRE, PENNSYLVANIA

*Industrial Equipment of Heat and Corrosion Resistant* WEIGHT-SAVING *Sheet Alloys*

☆ ☆ ☆ OFFICES IN PRINCIPAL CITIES ☆ ☆ ☆

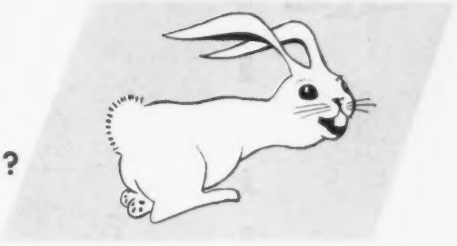
# Regardless of your Core Baking Practice,



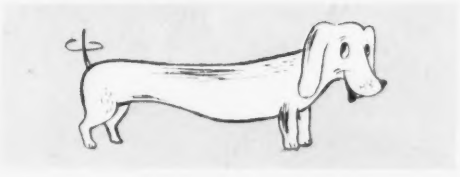
SLOW?

HIGH?

FAST?



LOW?



## you'll be SAFER with HOUGHTON HY-TEN CORE OIL

Whether you bake your cores in mechanized ovens at 450° F. to 550° F. on a fast cycle or bake them slowly overnight in ovens at only 350° F. to 425° F., Houghton has the Hy-Ten Core Oil you need.

Hy-Ten gives you the green strength to resist warping prior to and during baking—it bakes out thoroughly in heavy sections—it resists burn-out in thin sections—it produces cores that withstand the flow of molten metal, yet shake out clean and easy.

Cut down your scrap loss due to core failure. Write today for information on Hy-Ten Core Oils, stating your sand type, baking time and temperature, present formula, and the metal poured. We'll be glad to help you. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Hy-Ten Core Oils . . . products of

**E. F. HOUGHTON & CO.**

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***Ready to give you on-the-job service . . .***

# "They're darn good... for 3 REASONS"

On being asked for his reaction to Tabor Column Jar-Squeezers, the superintendent of a large eastern foundry said: "They're darn good, and for 3 reasons."

"Equipped with those Tabor automatic blow-off valves, they deliver a *uniform* squeeze. We work in a wide range of pressures, so squeeze accuracy is doubly important. For us, the Tabor's precision mechanism leaves nothing to chance. Result? Better molds . . . and better castings."

He emphasized his second point! "They are easy to operate . . . speedy. The ball bearing head quickly swings in and out of squeezing position. Riddle-rack, molder's bench, valves, pressure gauge and dusting valve are designed and located to save operation time. So, we're getting not only better castings, but more of them."

"Finally, our Tabor Squeezers really 'take it'. I was told they were rugged, *and they are.* We simply take low maintenance cost and long service life for granted."

Tabor has been designing and building foundry molding machines for over 60 years. The returns *you* can expect from Tabor equipment stem from this long experience. Whatever your foundry machine requirements, call on us.

REPRESENTATIVES

Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H. Reich, Trussville, Ala.

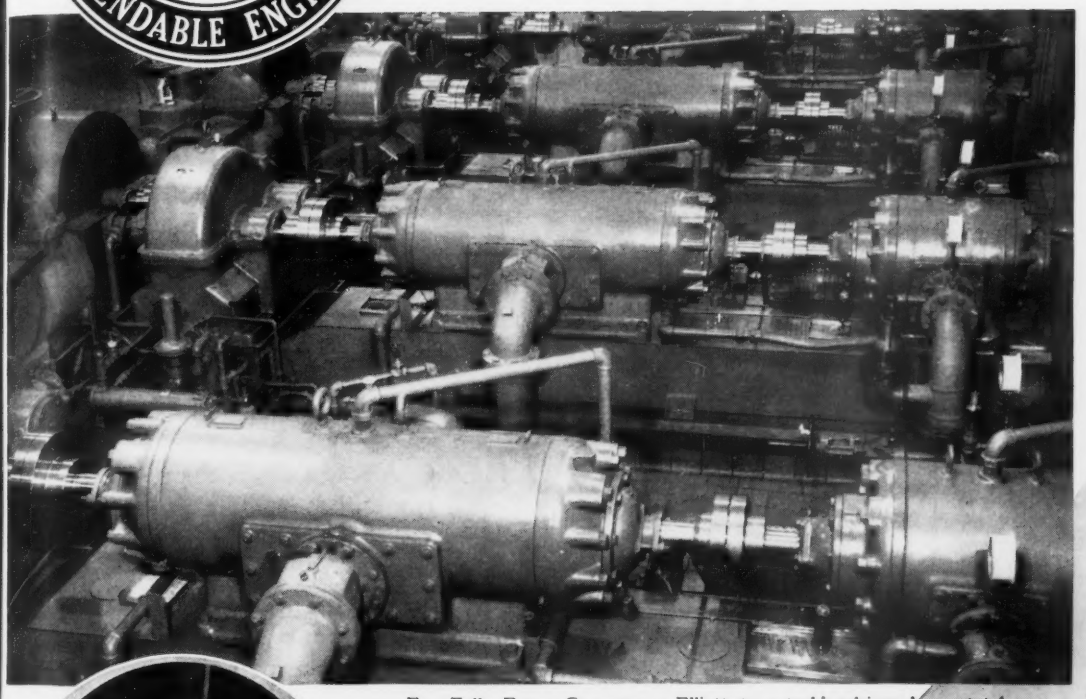
MANUFACTURERS ASSOCIATION INC. FOUNDRY EQUIPMENT

## *The* TABOR *Manufacturing Co.*

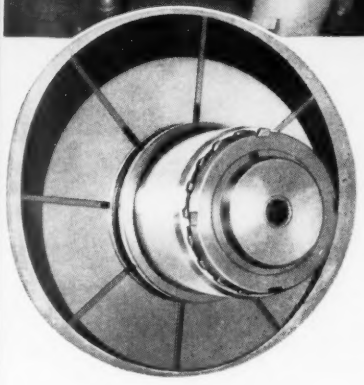
SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES

6225 TACONY STREET • PHILADELPHIA 35, PENNA.

# PRATT & WHITNEY AIRCRAFT



Four Fuller Rotary Compressors, Elliott steam-turbine driven, have a total capacity of 6760 c.f.m., at 110 p.s.i.



## depends on FULLER AIRPOWER

Four Fuller Rotary Two-stage Compressors put Pratt & Whitney Aircraft's engine plant in East Hartford on a 100 p.s.i. air diet for such operations as shot peening, spray booths, air cleaning, and air-operated chucks.

Pratt & Whitney Aircraft has joined no *small* family of users; food and chemical plants, steel mills and cement mills, gas-gathering plants, refineries, automobile plants, foundries and machine shops, public utilities, and many others depend on Fuller for compressor equipment, wherever air is required.

Whether *your* air-plans call for single-stage, two-stage — single-stage duplex or two-stage duplex—you can be sure Fuller has the compressors which gives you a dependable source of pulsation-free air up to 3300 c.f.m., 125 p.s.i., with maintained capacity for the life of the machine.

Write for Bulletin C-6, Fuller Rotary Compressors.

FULLER COMPANY, Catasauqua, Pa.
Chicago 3—120 So. LaSalle St.
San Francisco 4—420 Chancery Bldg.

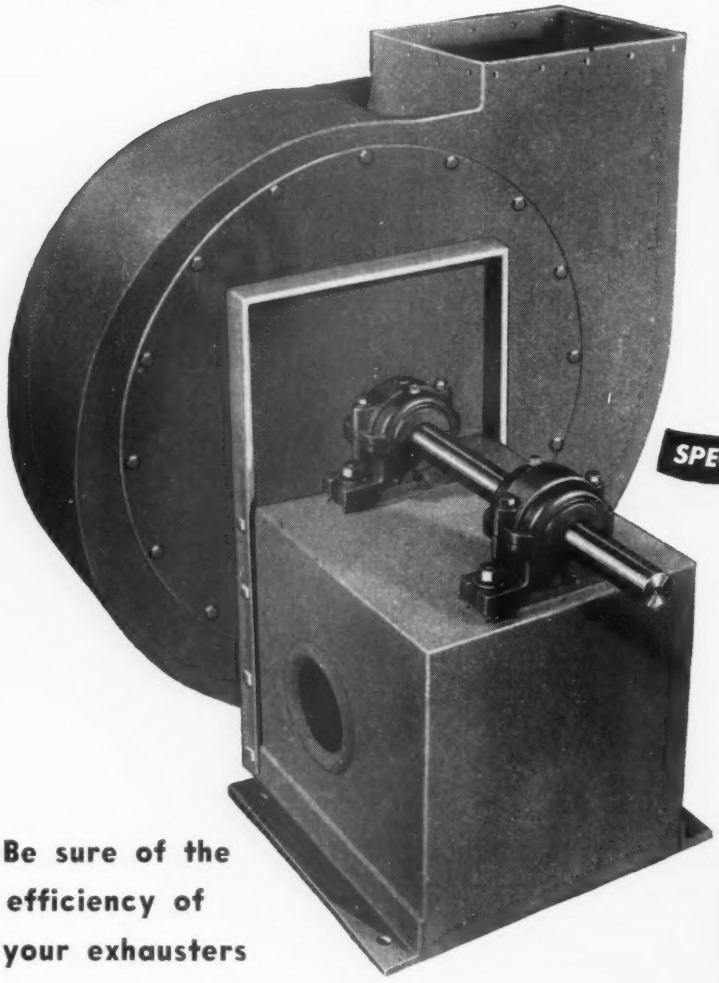
**Fuller**

**PIONEERS OF HIGH-EFFICIENCY VANE-TYPE ROTARY COMPRESSORS**

C-225
1624

"Buffalo"

*Tips on Getting the Best Service from your* **Fans**



**FOR MOST ECONOMICAL**

# EXHAUST SERVICE

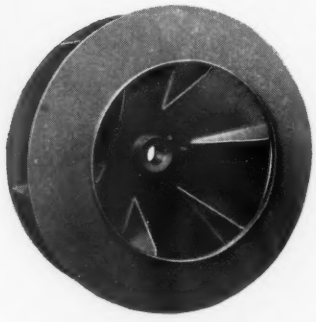
## Year-In, Year-Out

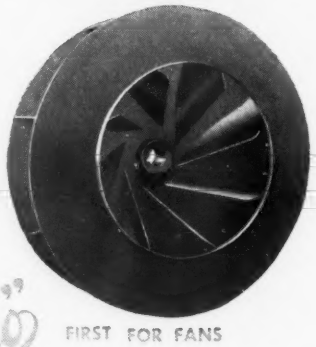
**SPECIFY "BUFFALO" INDUSTRIAL EXHAUSTERS**

Lighter and stronger than riveted construction, "Buffalo" Industrial Exhausters have all-welded steel plate housings and rotor blades to stand up under the constant punishing service to which most mill exhausters are subjected. This means long-term savings.

**Be sure of the efficiency of your exhausters**

*An inefficient fan is a power-waster, especially in continuous, heavy exhaust duty—more so if you have several fans going. But the smooth interior surfaces of "Buffalo" all-welded exhausters mean less friction—more efficient handling of air or materials. Then too, "Buffalo" Air Wheels and Material Wheels are shaped for efficiency—not the straight paddle wheel type.*





Top, type "MW" Materials Wheel with stiffening back plate and flange. Bottom, type "AW" Air Wheel. Both are interchangeable.

**IT PAYS TO INVESTIGATE!**

*For all engineering details on these efficient, long-lived exhausters, write today for Bulletin 3576.*

"Buffalo" FIRST FOR FANS

DIAMOND JUBILEE 75TH ANNIVERSARY

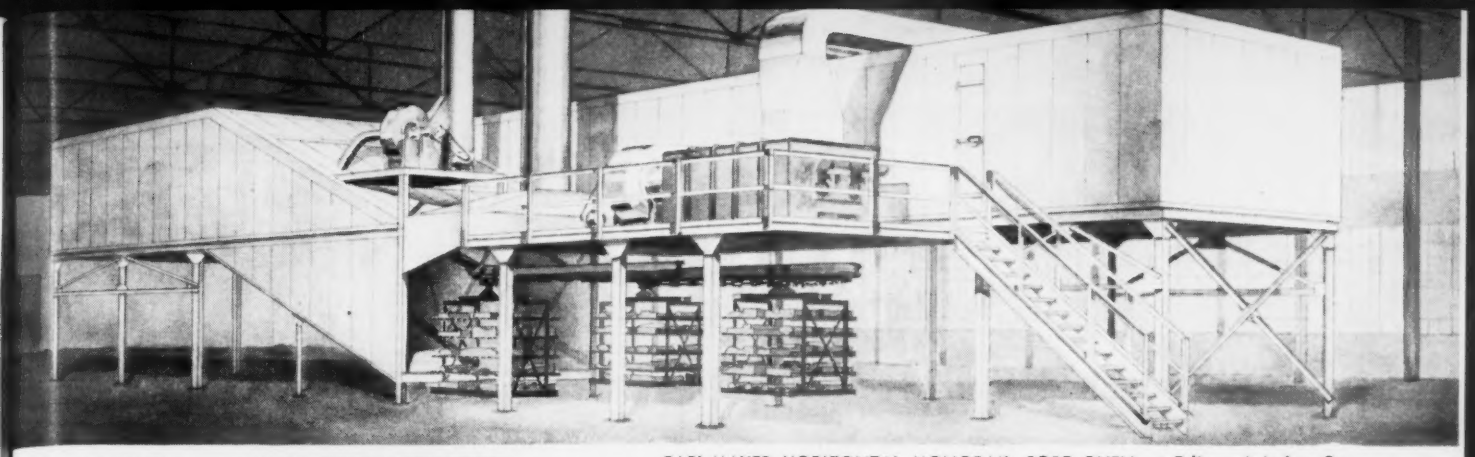
# BUFFALO FORGE COMPANY

221 MORTIMER ST. BUFFALO, NEW YORK

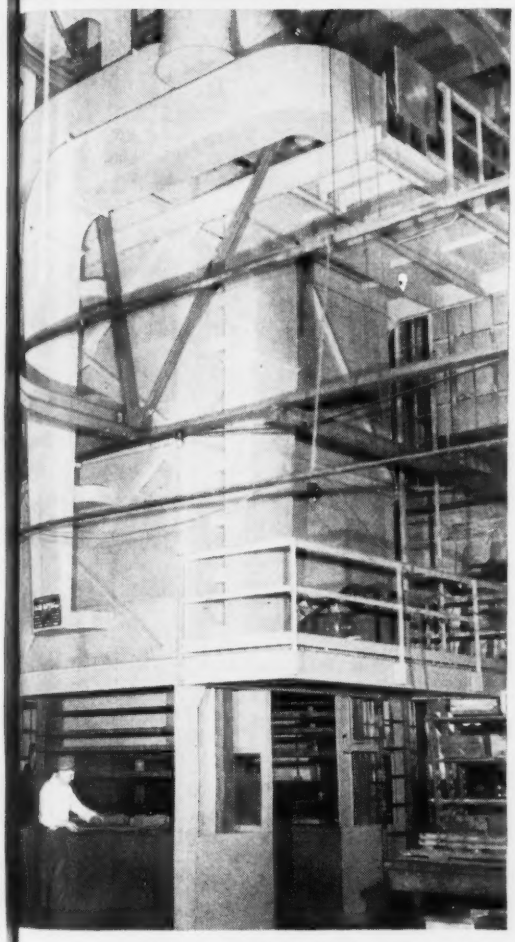
*PUBLISHERS OF "FAN ENGINEERING" HANDBOOK*

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

VENTILATING | PRESSURE BLOWING | AIR CLEANING | COOLING | AIR TEMPERING | HEATING | INDUCED DRAFT | FORCED DRAFT | EXHAUSTING



CARL-MAYER HORIZONTAL MONORAIL CORE OVEN at Eclipse Aviation Co.
Patent No. 2355814

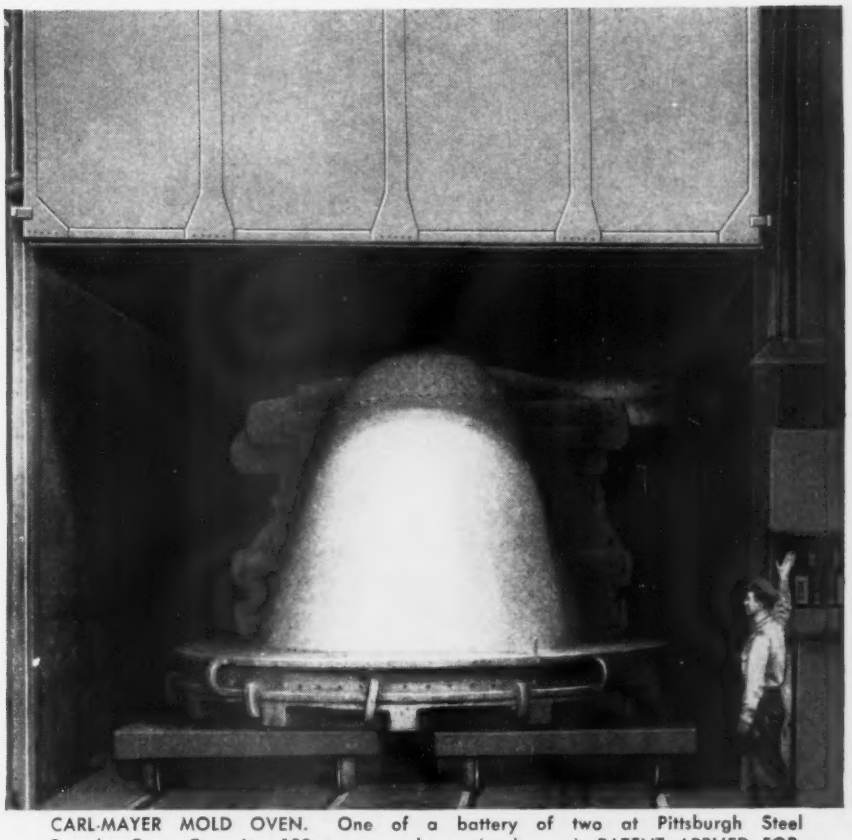


CARL-MAYER VERTICAL CORE OVEN
at G. & C. Foundry Company
Patent No. 2257180.

# "BIG" Engineering brings big foundry oven jobs to CARL-MAYER

Carl-Mayer designs embody patented features which contribute to highest efficiency and economy in operation. It will pay you to consult us on your next core baking and mold drying problem. We build ovens of all types and sizes, also other types of industrial ovens and furnaces.

**Write For Bulletin No. 53-CM.**



CARL-MAYER MOLD OVEN. One of a battery of two at Pittsburgh Steel Foundry Corp. Capacity: 100 tons per charge (each oven). PATENT APPLIED FOR.

## CARL-MAYER CORE AND MOLD OVENS ARE SERVING CONCERNS LIKE THESE:

- minum Co. of America
- erican Brake Shoe Co.
- erican Radiator Co.
- w-Knox Co.
- wn Industries
- k Motor Div. of General Motors Corp.
- yrus-Erie Co.
- illac Motor Div. of General Motors Corp.
- umbia Steel Corp. (U. S. Steel Corp.)
- cible Steel Castings Co.
- kirk Radiator Co.
- pse Aviation Division of endix Aviation Corp
- tric Autolite Co.
- d Motor Co.
- mont Foundry Co.
- C. Foundry Co.
- eral Electric Co.
- eral Motors Corp. and ubsidiaries
- Gilbert & Barker Co.
- General Steel Castings Co.
- Golden Foundry Co., Inc.
- Henry Kaiser Corp.
- W. O. Larson Foundry Co.
- Mesta Machine Co.
- F. E. Meyers & Bro. Co.
- Oil Well Supply Co. (U. S. Steel Corp.)
- Packard Motor Car Co.
- Pittsburgh Steel Foundry Corp.
- H. B. Salter Co.
- Shenango Penn Mold Co.
- Standard Foundry Co.
- Union Brass & Metal Mfg. Co.
- Union Steel Castings Co.
- West Michigan Steel Castings Co.
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- Whiten Machine Works
- Whiting Corp.

## THE CARL-MAYER CORP.

**3030 Euclid Ave., Cleveland, Ohio**

***Backed by reputation and over 30 years' experience***

# Now . . . Seams Reduced to **ABSOLUTE MINIMUM** on these NEW AO Gloves!

## HAND PROTECTION

AO 514 ASBESTOS GLOVE

Yes, for workers' comfort . . . for savings for our customers, we've redesigned our asbestos glove line to eliminate seams wherever possible. By reducing seams from 8 to 3, there's not only greater working ease for the user but longer work life for the glove.

**MAKE THIS COMPARISON TEST!**

Look at any conventional asbestos glove. Note the vertical seams that extend to the cuff. Note the seams that secure gauntlet to glove. Now check against the large photograph here. You'll see the seams on the thumb and only ONE SEAM extending the length of the glove (on the back). Note also the absence of horizontal seams—(thus assuring a stronger glove and longer life which means valuable savings).

AO 1514 Glove with leather-reinforced palm.

AO 2514 Glove with asbestos-reinforced palm.

AO 3514 Glove with full leather-reinforced palm and finger area.

***QUICK FACTS:***

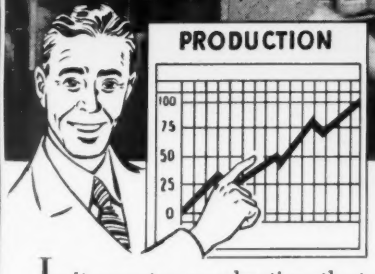
- Finest grade specially treated asbestos, recommended for extreme heat.
- Yarn is closely woven.
- Double stitched for long service.

AO's Industrial Vision Program increases production, decreases accidents. Write today for free booklet "Improved Industrial Vision" to 1113 Vision Park, Southbridge, Massachusetts.

American Optical COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

# INCREASE FOUNDRY OUTPUT WITH EFFICIENT TRAMRAIL HANDLING




## 25% to 100% Greater Production Often Obtained

Is it greater production that you want? Are lower costs important? Would you like these advantages without enlarging your present plant? Then consider Cleveland Tramrail overhead materials handling equipment.

In many instances the installation of Cleveland Tramrail cranes, bridges, carriers, hoists, etc. have so cut handling time, speeded production and brought about other advantages, that 25% to 100% greater output is obtained with the same floor area.

Cleveland Tramrail is adaptable to all size and type foundries, and just as great relative savings can be made by a 10-man foundry as one employing 1000. The equipment is available for hand or electric operation, or various combinations thereof, to best serve the requirements.

Why not get the facts on the modern overhead Tramrail way of foundry handling? Learn first hand what it has done for hundreds of other foundries. This might well lead to an entirely new and profitable future course for your company.

*GET THIS BOOK!*
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

**CLEVELAND TRAMRAIL DIVISION**
THE CLEVELAND CRANE & ENGINEERING CO.
3832 East 286th St., Wickliffe, Ohio

**CLEVELAND TRAMRAIL**
**OVERHEAD MATERIALS HANDLING EQUIPMENT**

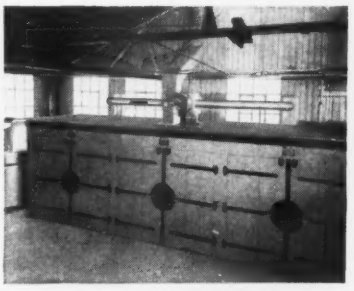
# A LOT MORE THAN FANS DUCTS, HEATERS AND PANELS GO INTO . . .

# LANLY FOUNDRY OVENS

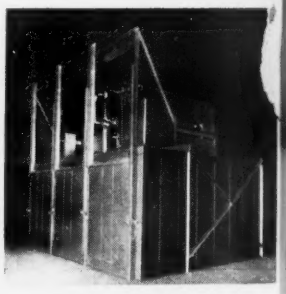
The proper adaptation and utilization of the essential component parts in every LANLY OVEN for maximum operating efficiency and economy, is a certainty being proved every day in foundries throughout the country. Specialized knowledge evolved from long experience and close cooperation with our customers enables us to design and erect better foundry ovens.

Upon receipt of information covering your needs, we will submit a proposal for an oven that will be thoroughly guaranteed as to construction and performance.

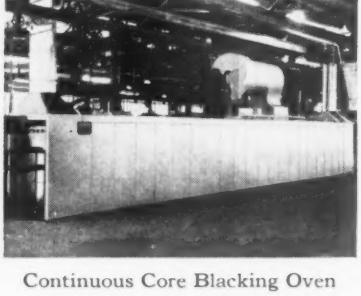
**LANLY CAR TYPE OVEN** featuring fast, uniform drying with low fuel consumption. Complete automatic operation. Sturdy construction yet pleasing in appearance. Comparative low initial cost.



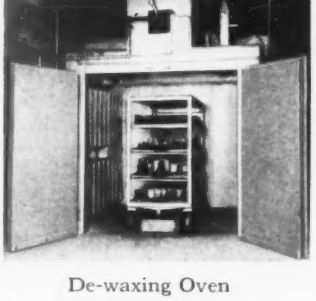
Three Compartment Rack Type Oven



3 Compartment Rack Type Oven

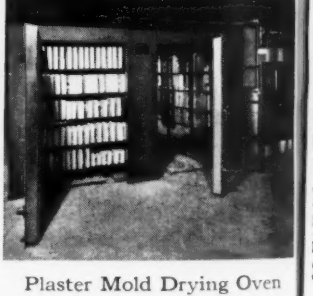


Continuous Core Blacking Oven



De-waxing Oven

Combination Rack and Drawer Type Oven



Plaster Mold Drying Oven

LANLY FOUNDRY OVENS

THE LANLY COMPANY • 780 PROSPECT AVE
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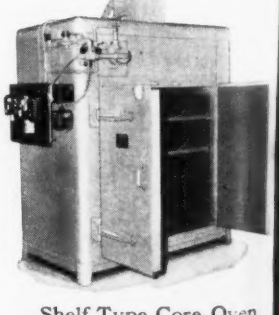
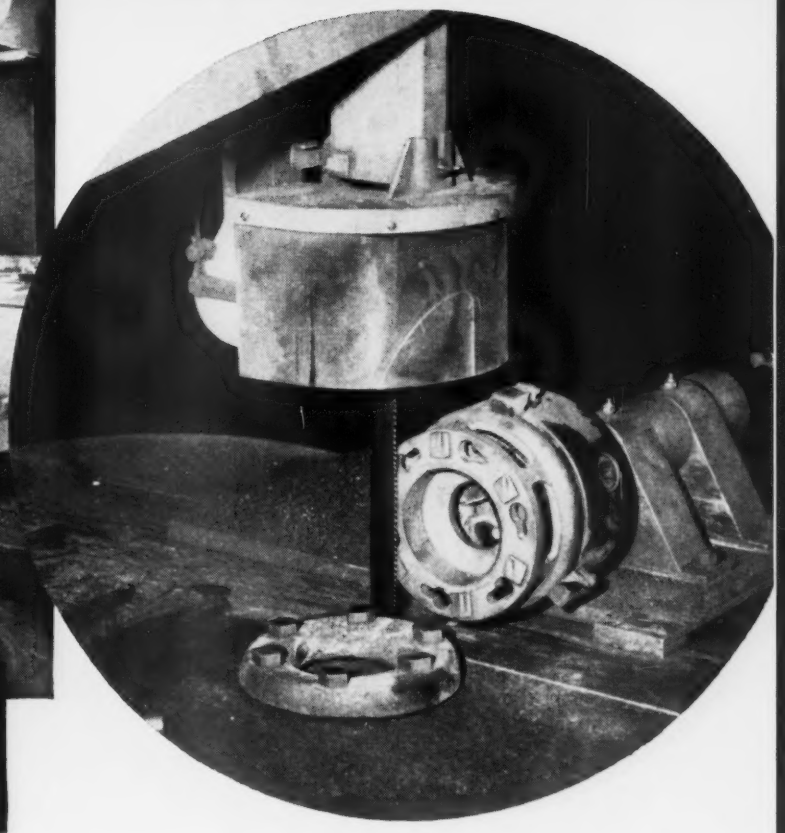
WRITE FOR THE LATEST CATALOG AND FACTS ON ANY INSTALLATION



Shelf Type Core Oven

# DoALL FRICTION SAWING TRIMS 6 GATES IN *FRACTION* of a *MINUTE*



**FRICTION SAWING WITH A DoALL ZEPHYR PROVES FASTER, CLEANER THAN ANY OTHER METHOD**

ALLOY PRECISION CASTINGS CO., Cleveland, had to find a quick and easy way to trim gates from stainless steel generator brackets. After consideration of various methods of handling this job, DoALL *friction sawing* was found to be by far the fastest and most economical way to meet the production requirements. They cut all six gates in a fraction of a minute with a DoALL Zephyr band machine and friction saw band. The job was done to a finer finish than possible with other methods, thereby saving time on further cleaning operations.

DoALL friction sawing (heat concentration to soften the metal ahead of the saw band) cuts all ferrous metals up to 1" thick. Cuts are made at speeds of 10,000 to 15,000 F.P.M. The DoALL friction saw band used gives you an accurate cut — gives finer finishes — reduces subsequent grinding. Ask for a FREE demonstration in your foundry. Call your local DoALL Sales-Service Store or write:

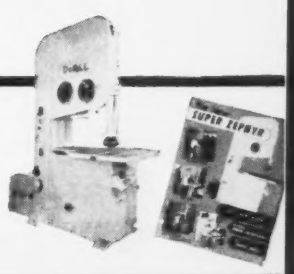
**The DoALL Company**
**254 N. Laurel Ave., Des Plaines, Illinois**

## DoALL Friction Saw Bands Available Now From Local Stock

**New DoALL friction saw bands have the teeth *locked in* by a special heat process giving you longer band life at lower cost. You can buy DoALL friction saw bands in 500 ft. coils or specially cut and welded lengths to fit your machine.**

**SEE THIS EQUIPMENT AT THE FOUNDRY SHOW ATLANTIC CITY, MAY 1-7**

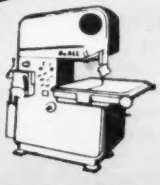
**WRITE FOR BULLETINS**

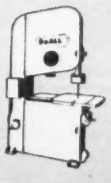


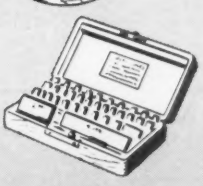

DoALL

SB-9

**CALL DoALL FOR:**

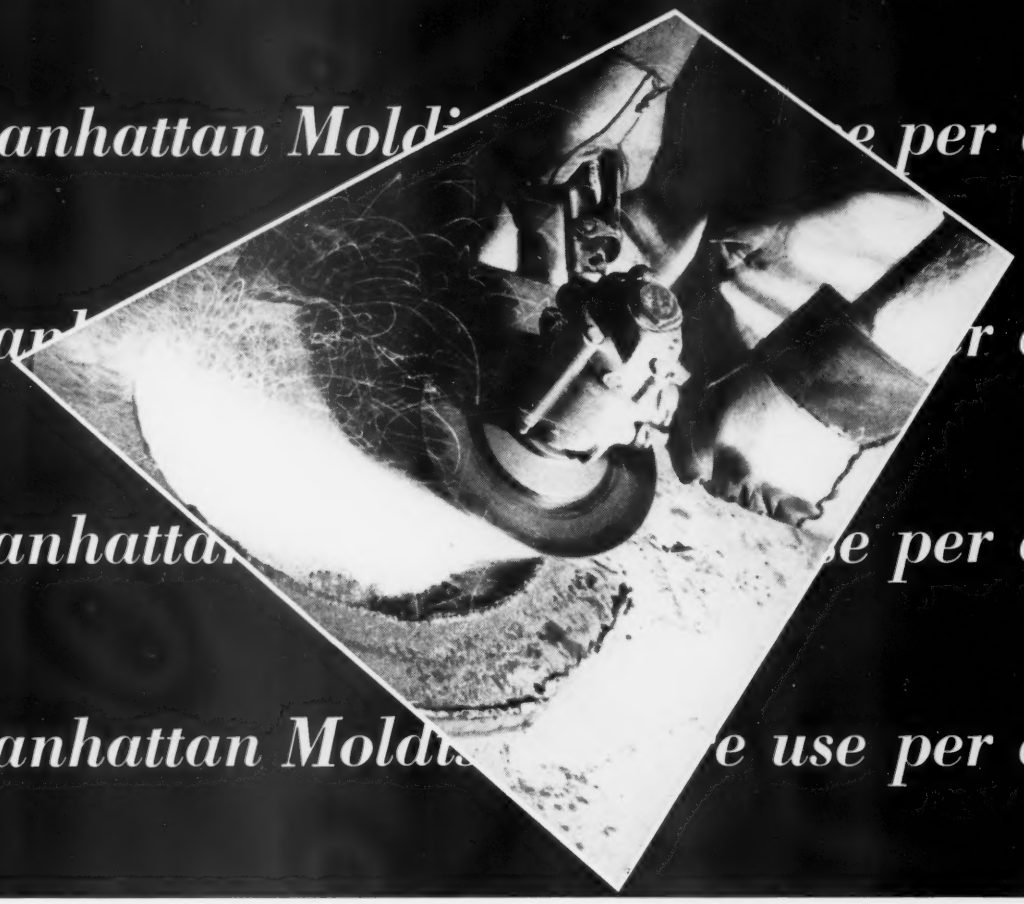






***Machine Tools . . . Gaging Equipment . . . Tool Steel . . . Band Tools . . . Metal Working Supplies***

*Manhattan Moldiscs—More use per dollar*



*Manhattan Moldiscs—More use per dollar*

**A FRESH CUTTING FACE . . .** throughout the life of the wheel means that Manhattan Moldiscs last longer . . . retain full metal removal efficiency right down to the last usable part of the wheel. The secret—Manhattan's special molded, resinoid bonded abrasive which presents a fresh cutting surface throughout the wheel thickness, and which does not load or glaze. Actual plant tests show that Moldiscs effect important savings in faster grinding time and fewer time-outs for disc changes. For MORE USE PER DOLLAR and better quality work specify Manhattan Moldiscs. Bonded in various resiliencies from fast roughing to fine finishing. Standard size 7″ x 1/4″ x 7/8″. For speeds to 6,000 RPM. Mounting flange and nut furnished on request.

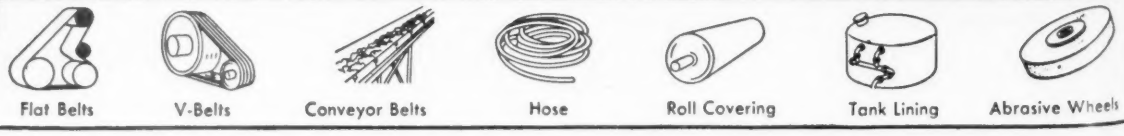
GRINDING WHEEL INSTITUTE MEMBER

**WRITE TO ABRASIVE WHEEL DEPARTMENT**

RM

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

**RAYBESTOS-MANHATTAN, INC.**



Flat Belts · V-Belts · Conveyor Belts · Hose · Roll Covering · Tank Lining · Abrasive Wheels

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
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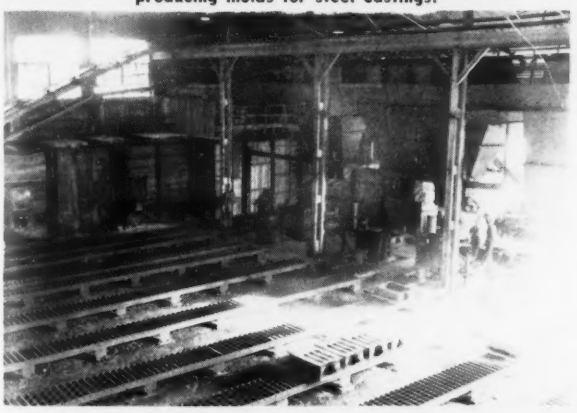
# DAVENPORT MOLDING MACHINES

Four powerful complete air-operated Davenport Jolt Roll-Overs producing molds for steel castings.



Gravity conveyors carry molds to pour-off, shake out and empty flasks returned.

**You,** too, can have production figures that will make you feel good! Davenport Molding Equipment has proven the backbone of every production set-up—from the small job shop to the highly mechanized production shop.

It will pay you to investigate . . . Write today for complete information.

## DAVENPORT Foundry Company

**REPRESENTATIVES**

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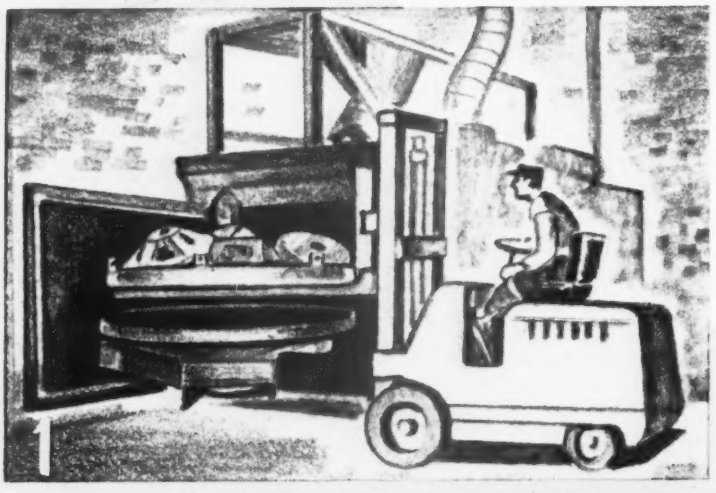
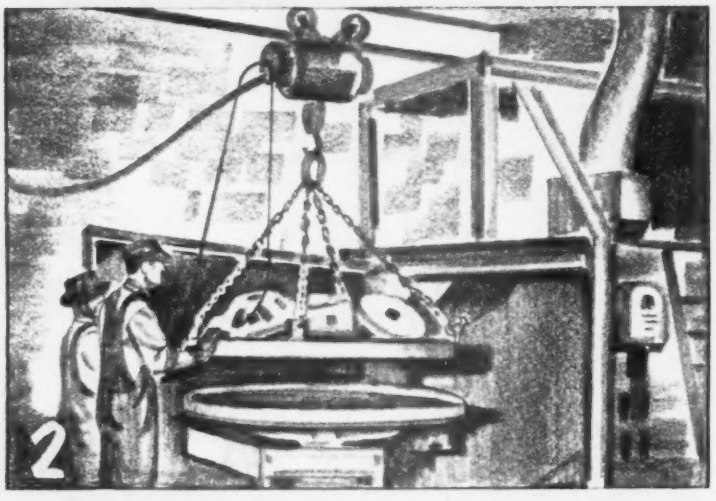
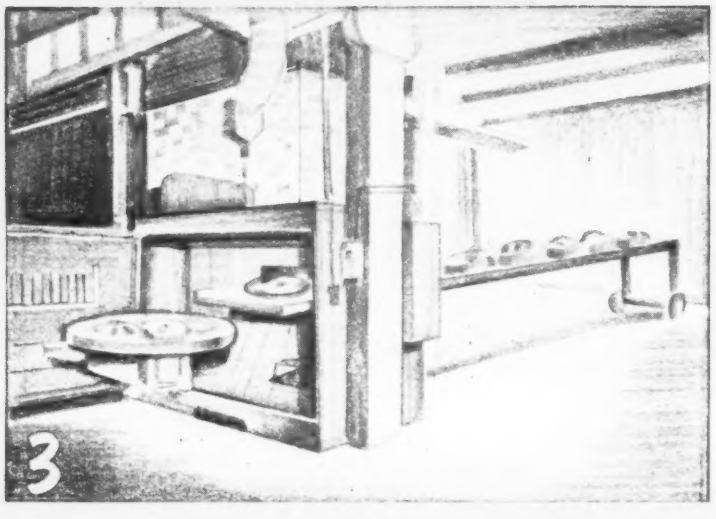
Teller Equipment Co., Ho-Ho-Kus, New Jersey
R. K. Price Associates, Inc., 70 Pine St., New York 5, New York
Ph. Bonvillain & E. Ronceray, Choisy-Le-Roi, Rue Paul Carle, Seine, France

# NOW clean a greater variety of

# WHEELABRATOR Swing Tables




There are three prime reasons why Wheelabrator Swing Tables cut cleaning costs: (1) a greater variety of sizes and shapes of parts can be cleaned in the Swing Table; (2) Work loads are cleaned in minutes that take hours by other methods; (3) *Downtime for loading and unloading is but a fraction of that required for other table and table room machines.*

Swing Tables handle a greater variety of parts and take less time to load because of their unique design wherein the work table is mounted on the door of the machine. With the door open, the work table is fully exposed for loading by crane.

**spend less time loading**
**more time cleaning**

## These work-handling methods cut costs:

1 *Lift Truck and Auxiliary Table*—With the door of the Swing Table open, the work table is fully exposed so that preloaded auxiliary tables can be quickly set in place by lift truck.

2 *Jib Crane and Auxiliary Table*—The full, unrestricted area above the work table makes it possible to place and remove pre-loaded auxiliary tables with a jib crane easily and without difficult maneuvering.

3 *Conveyor and Vestibule*—Swing Tables can be equipped with a vestibule and a roller conveyor for cleaning extra long pieces. One foundry is regularly cleaning work 16 ft. long in this manner as well as their production of smaller castings.

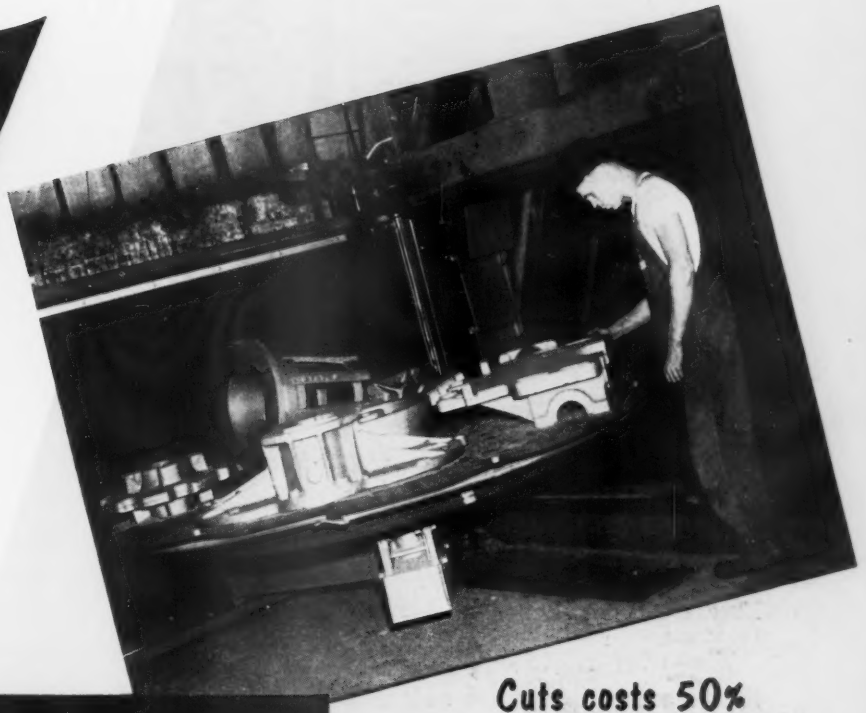
**CATALOG NO. 214A**
**SEND TODAY FOR**

THE AMERICAN WHEELABRATOR & EQUIPMENT CORP.

WORLD'S LARGEST BUILDERS OF

# f castings in less time . . .

## Swing Table



ber of work handling methods. Auxiliary
es, loaded while the machine is in operation,
he quickly set in place to cut downtime to a
imum. Loads are cleaned in minutes by the
rolled blast thrown by centrifugal force. This
scours away every trace of sand and scale
down to the virgin metal.

other single blast cleaning machine pro-
the versatility and time-saving work
dling convenience of the Swing Table. For
f, see the case histories
w.

**save money**
like these firms have

### Cuts costs 50% for Electric Steel Castings Co., Inc.

One man and a helper are now cleaning 400 tons of castings monthly in a Wheelabrator Swing Table . . . a job that formerly required 4 men in an airblast room. Cleaning costs have been cut in half and plant efficiency greatly improved.

### Cuts cleaning time 75% for Cherry Burrell

Installation of a Wheelabrator Swing Table slashed cleaning time at least 75% in replacing 3 tumbling mills. On some castings, the reduction in cleaning time is even greater. All castings are now cleaned in 4 to 5 hours daily where previously 8 to 12 hours a day was not sufficient to keep up with production requirements.

### Reduces cleaning room man-hours for Sioux City Foundry & Boiler Co.

"Our Wheelabrator Swing Table has reduced cleaning room man-hours approximately 38% in cleaning gray iron castings ranging in weight from one pound to 600 pounds.

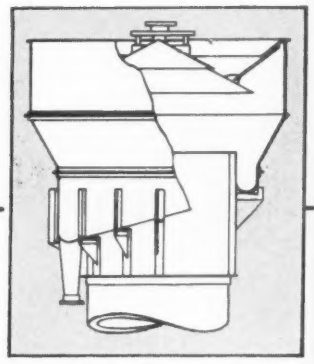
"Furthermore, the Wheelabrator has proved a great sales stimulant because of the foundry's ability to render almost super-service due to increased speed of finishing."

American

505 S. Byrkit St.

**WHEELABRATOR & EQUIPMENT CORP.**
Mishawaka, Indiana

IRLESS BLAST EQUIPMENT



## SCHNEIBLE

# CUPOLA COLLECTORS

## WASH OUT FOUNDRY FLY-ASH AND FUMES TO CUT BUILDING MAINTENANCE COSTS

Here's a modern automotive foundry with 8 Schneible Cupola Collectors on guard against corrosion and deterioration. Fly-ash and fumes cannot play havoc with roofs, gutters, stacks or machinery. Building maintenance is kept at a minimum.

These Schneible Collectors effectively wash out the elements that cause nuisance and sluice them away to dewatering and recirculating tanks for easy removal.

Economy of operation and efficiency are outstanding features of these Cupola Collectors. Water conservation is assured because the dewatering tanks are designed to purge and recirculate the same water continuously. There are no moving parts that require maintenance and the water distribution head cannot clog.

Your local Schneible representative has further information or write direct for bulletin No. 449.

**CLAUDE B. SCHNEIBLE COMPANY**

P. O. Box 81, North End Station
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*REPRESENTATIVES IN PRINCIPAL CITIES—CONSULT YOUR LOCAL TELEPHONE DIRECTORY.*

# Late Foundry News

MARCH 25, 1953

**RETURN TO NORMAL:** It's near the end of the road for the government controls that have regulated prices and materials allocation for many months. The lid has been lifted from all prices—six weeks before the Apr. 30 expiration date fixed by existing law. The Controlled Materials Plan will be supplanted by the Defense Materials System, a procedure that will assure materials for direct defense and atomic energy programs. So-called "defense supporting" industries must take their chances on the open market for supplies, but there appears to be enough raw material to go around, nothwithstanding an active demand from civilian goods manufacturers.

**INDUSTRIAL EXPANSION:** About 65 per cent of the Office of Defense Mobilization's industrial expansion program was completed by the opening of this year, it is estimated by ODM. Of the 229 certificates of necessity approved as of last Sept. 30 for iron and steel foundries, nearly 80 per cent of the value of the facilities being added for ferrous castings production was in place Jan. 1. Additional foundries granted certificates recently, and amounts involved, include: Union Mfg. Co., New Britain, Conn., $62,737; Dick Brothers Inc., Reading, Pa., $429,056; Ross-Meehan Foundries Inc., Chattanooga, Tenn., $231,627; Mohawk Foundries Inc., Cleveland, $341,903.

**MORE GRAY IRON:** ODM has set up a new expansion goal for capacity to produce large gray iron castings (over 3000 pounds). It calls for an increase of 160,000 tons in the industry's annual capacity. The expansion is to be achieved either through new facilities or by equipping existing foundries to handle these larger castings. Iron and Steel Division of NPA will supply further details to foundries interested in participating in the program.

**ALUMINUM SCRAP:** Government control over Aluminum scrap has been ended with revocation of Order M-22 by NPA. Removal of price control over scrap has made regulation of distribution, delivery and use unnecessary, NPA says. Aluminum metal supply for the second quarter is expected to be 415,000 tons, ample for both military and civilian needs.

**WHAT WE SPENT:** In the first half of fiscal 1953 (July-December 1952) the Department of Defense placed orders involving $17.6 billion for major equipment and supplies, military construction and expansion of military production facilities. More than half of this was for the Air Force. In the 30 months since Korea, expenditures have totaled $138.1 billion—$34.2 for the Army, $24.3 for the Navy and $39.6 for the Air Force. During the same period a total of $169.7 billion was made available to the Department of Defense.

**MORE FOR TOOLS:** To maintain present living standards industry must invest by 1960 about $200 billion—almost what it invested the last 30 years—according to Dean E. Carson, business research director for B. F. Goodrich Co. He says the indicated 15 per cent increase in population from 1950 to 1960 will add mostly to the consuming group. Workers can support this larger number of people only by being provided more effective plants and equipment—$200 billion worth.

**FOUNDRIES SPURT:** Recent release by the Bureau of the Census on its 1951 annual survey of manufactures show that for all industries the value added by manufacture increased nearly 14 per cent over 1950 and employment was up almost 6 per cent. Foundries had gains of 28 per cent in value added and 16 per cent in employment. "Value added" is the value of products shipped less the cost of materials, supplies, etc. For foundries this figure totaled nearly $2 billion.

**NAVY SCRAP:** The Navy was a big source of metal scrap last year. It sold 205,200 tons of iron and steel scrap, more than 4500 tons of nonferrous scrap and 1000 tons of mixed ferrous and nonferrous material. Total sales, including nonmetallic scrap, netted $7,756,315.

**FOUNDRY PERSONNEL:** Discussion of the subjects of attracting and utilizing plant personnel, and assimilation of engineering graduates in the foundry, will feature the afternoon program of the Malleable Founders' Society's Western Section meeting at the Drake Hotel, Chicago, Apr. 24.

**BRASS INGOT:** Foundries consumed 325,786 tons of brass ingot in 1951, according to a tabulation just completed by the U. S. Bureau of Mines. Ohio was the largest user—55,437 tons—and the five East North Central states comprised the largest consuming area, accounting for more than 45 per cent of the total. Leaded red brass repre-

sented 54 per cent of all consumption, followed by leaded tin bronze with 16 per cent.

**ARTIFICIAL GRAPHITE:** Capacity to produce artificial graphite and carbon electrodes in quantities sufficient to meet all anticipated government and civilian needs will be available upon completion of the current expansion program, according to industry representatives. By 1954 graphite production capacity is expected to reach 359 million pounds, carbon capacity 222 million pounds.

**NEW LICENSEE:** Pittsburgh Lectromelt Furnace Corp., Pittsburgh, has been exclusively licensed in the United States to produce high-frequency electric induction furnaces developed by Allmanna Svenska Electriska Aktiebolaget (ASEA), Vasteras, Sweden. Units will be built in 11 sizes ranging from 500 lb to 15 tons charging capacity.

**LEAVES NPA:** Walter M. Clark, who has served the Foundry Branch of the NPA Copper Division since 1951, is leaving Apr. 15 to return to D. W. Clark & Co., Boston.

**PLANT SAFETY:** A new leaflet on plant safety, "Reducing Accident Costs Through Safe Work Methods," has been prepared by the Small Defense Plants Administration and is available through the agency's field offices. This is the fifth in a series of six on this subject.

**MISCELLANY:** Crouse-Hinds Co., Syracuse, N. Y., has started construction of a new foundry having 45,000 sq ft of floor area . . . Progress Pattern Co., Detroit, has bought the American Magnesium Casting Co.'s pattern shop including land, building and equipment, at Pontiac, Mich., and will move to the latter site. Walter S. Miller is president . . . Reconstruction Finance Corp. has approved a $100,000 loan to the Blackhawk Foundry & Machine Co., Davenport, Iowa, to be used partly to purchase equipment for the production of aircraft castings . . . Prices of secondary aluminum, brass and bronze, and primary magnesium ingots have been increased by producers . . . During 1952 the Air Force collected at its various domestic installations nearly 35,000 tons of iron and steel scrap and about 15,000 tons of nonferrous scrap.

# PRICES OF FOUNDRY METALS AND COKE (As of Mar. 25, 1953)

## FOUNDRY COKE

(Per net ton, f.o.b. ovens)

**BEEHIVE**

| | |
|---|---|
| Connellsville | $16.50-17.50 |
| New River | 20.80 |
| Wise County | 15.95 |

**OVEN**

| | |
|---|---|
| Birmingham | $21.65 |
| Chicago | 24.50 |
| Detroit | 25.50 |
| Erie, Pa. | 25.00 |
| Everett, Mass. | 26.05 |
| Indianapolis | 24.25 |
| Kearney, N. J. | 24.00 |
| Milwaukee | 25.25 |
| New Haven, Conn. | 23.45 |
| Painesville, O. | 25.50 |
| Philadelphia | 23.95 |
| Portsmouth, O. | 24.00 |
| St. Louis | 26.00 |
| Swedeland, Pa. | 23.85 |
| Terre Haute, Ind. | 24.05 |

## PIG IRON

(Per gross ton f.o.b. furnace)

| | No. 2 Foundry | Malleable |
|---|---|---|
| Bethlehem, Pa. | $57.00 | $57.50 |
| Birmingham | 51.38 | .... |
| Buffalo | 55.00 | 55.50 |
| Chicago | 55.00 | 55.00 |
| Cleveland | 55.00 | 55.00 |
| Everett, Mass. | 59.25 | 59.75 |
| Fontana, Calif. | 61.00 | .... |
| Geneva, Utah | 55.00 | .... |
| Granite City, Ill. | 56.90 | 57.40 |
| Lone Star, Tex. | 51.00 | 51.00 |
| Neville Island (Pittsburgh) | 55.00 | 55.00 |
| Steelton, Pa. | 57.00 | 57.50 |
| Swedeland, Pa. | 59.00 | 59.50 |
| Toledo, O. | 55.00 | 55.00 |
| Troy, N. Y. | 57.00 | 57.50 |
| Youngstown, O. | 55.00 | 55.00 |

## NONFERROUS INGOT

**BRASS AND BRONZE:** 85-5-5-5—29.50c; 88-10-2—41.75c; 80-10-10 — 35.00c; No. 1 yellow — 24.00c.

**ALUMINUM:** 99 per cent plus, primary ingots 20.50c. Secondary No. 12 alloy 22.75. Deoxidizing grades: No. 1 23.00-24.00c; No. 4 22.00-22.50c.

**MAGNESIUM:** 99.8 per cent standard ingots 27.00c, f.o.b. Freeport, Tex.

**COPPER:** Electrolytic 27.50-34.00c, Connecticut valley; Lake 32.125c, delivered.

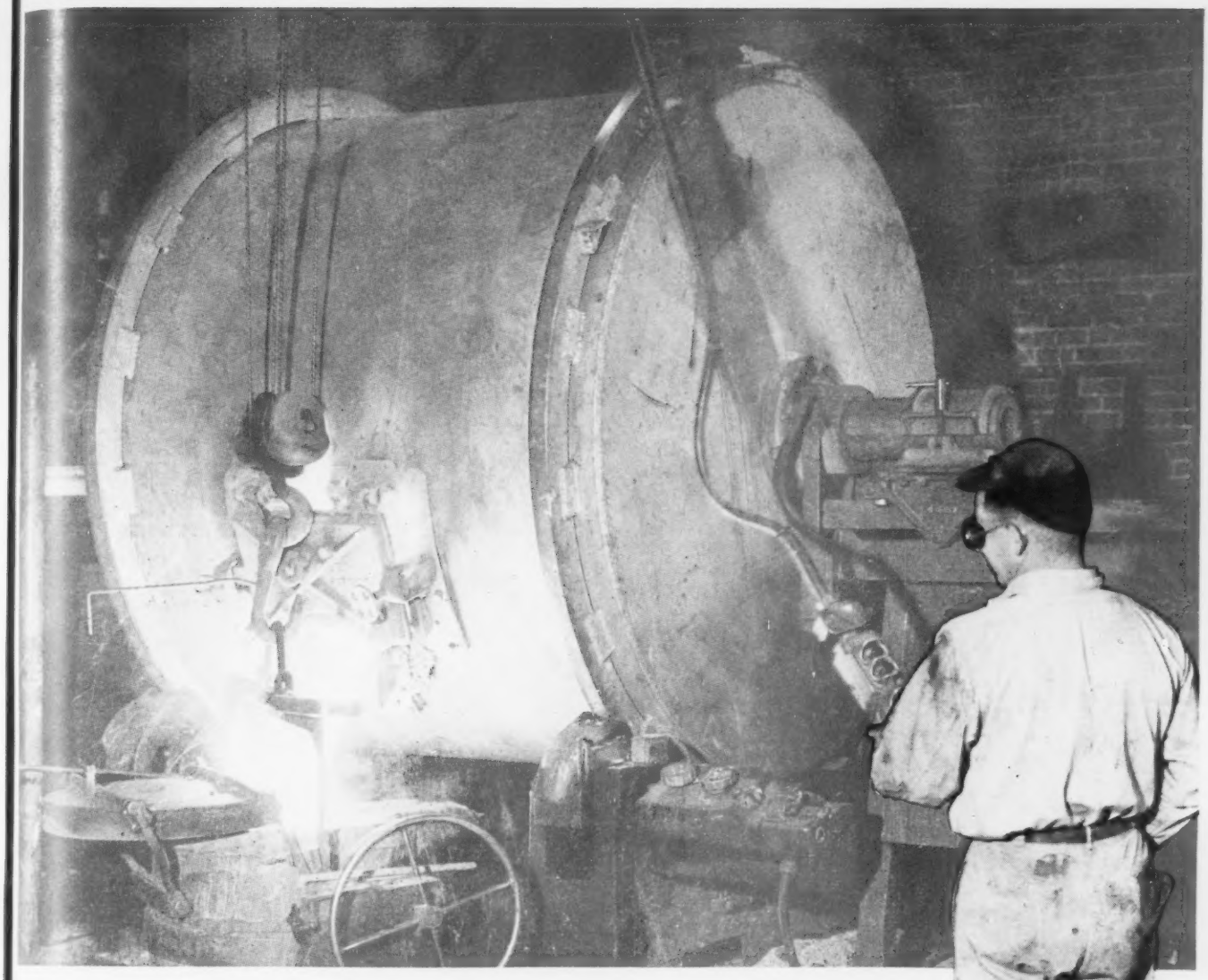
**ZINC:** High grade 12.35c, delivered. Die casting alloy 15.50c, delivered.

## IRON AND STEEL SCRAP

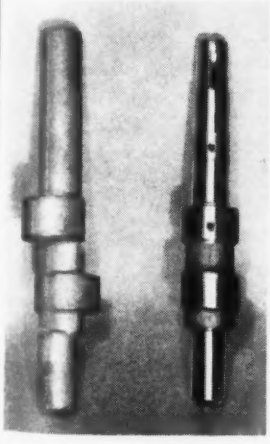
(Consumer prices per gross ton delivered, except as otherwise noted)

| | No. 1 Heavy Melting Steel | No. 1 Cupola Cast | Heavy Breakable Cast | Clean Auto Cast | Machinery Cast | Malleable | Short Steel Rails |
|---|---|---|---|---|---|---|---|
| Birmingham | $39.00-40.00 | **$43.00-44.00 | **$36.00-37.00 | **$52.00 | **$42.00-43.00 | $55.00 | $46.00-49.00 |
| Boston* | 34.17 | 34.00-35.00 | .... | .... | 46.00-47.00 | .... | .... |
| Buffalo | 45.00-46.00 | **42.50-43.00 | 40.00-41.00 | .... | **45.50-46.00 | .... | 52.00-53.00 |
| Chicago | 42.50 | 43.00-45.00 | 40.00-41.00 | 48.00-50.00 | 46.00-48.00 | 46.00-48.00 | 53.00-55.00 |
| Cincinnati** | 41.35 | 46.00 | 38.00-40.00 | 52.00 | 49.00-50.00 | 55.00 | 60.00-62.00 |
| Cleveland | 44.00-44.50 | 47.00-48.00 | 44.00-45.00 | 52.00 | 49.00 | 50.00-51.00 | 58.00-60.00 |
| Detroit* | 39.00-40.00 | 47.50 | 43.00 | 50.00 | 52.00 | 48.00 | .... |
| Los Angeles | 30.00 | 38.00-41.00 | .... | .... | .... | .... | .... |
| New York* | 38.00-39.00 | 40.00 | 40.00 | .... | 43.00 | .... | .... |
| Philadelphia | 46.00 | 43.00-44.00 | 46.50 | .... | 50.00-51.00 | 55.00-56.00 | 64.00-66.00 |
| Pittsburgh | 44.00 | 47.00-48.00 | 44.00-45.00 | .... | .... | 49.00-50.00 | 56.00-57.00 |
| San Francisco | 30.00 | **37.50 | **45.00 | 52.00 | 52.00 | 55.00 | 42.00-45.00 |
| Seattle | 30.00 | **40.00 | **36.00-38.00 | .... | .... | .... | .... |

* Brokers' buying prices. ** F.o.b. shipping point.



# This furnace helps make ice cubes and cool breezes



Raw casting and finished crankshaft of York hermetic compressor. Cast from metal melted in Detroit furnace.

TWO Detroit Rocking Electric Furnaces produce the iron alloys for castings used by York Corporation in their ice-making and air conditioning equipment. The furnace illustrated has an 8000 lb. capacity; the other's capacity is 2000 lbs.

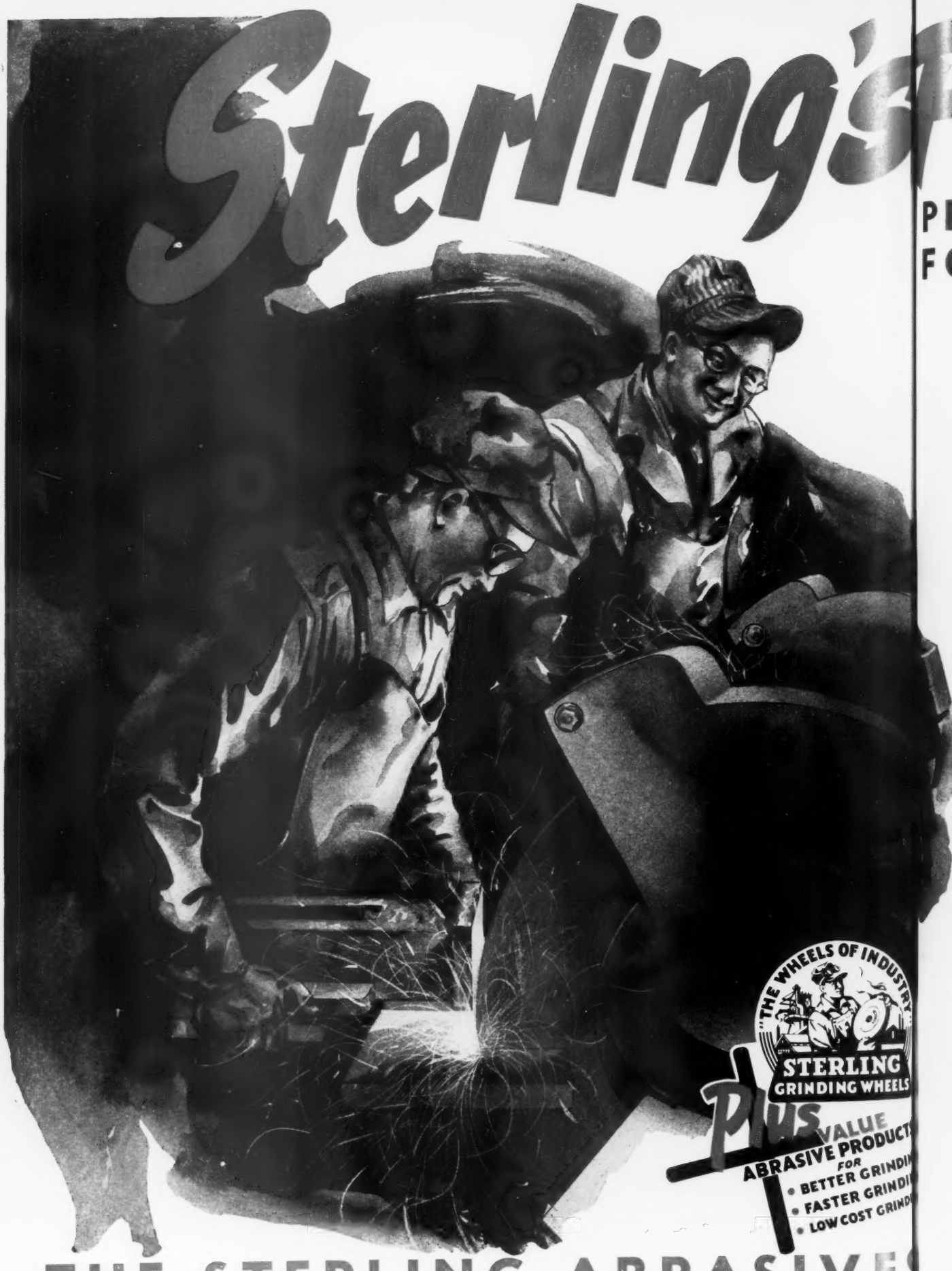
In the York foundry, Detroit Rocking Electric Furnaces were chosen to meet the requirements for high quality heats produced with speed and economy. Rocking action of the furnaces makes full use of heat from the indirect arc, and guarantees a homogeneous melt. Better metal means better castings, fewer rejects, lower cost.

Investigate Detroit Rocking Electric Furnaces for your needs. For ferrous and nonferrous metals. Capacities from 10 to 8000 lbs. Each installation is engineered to fit *your* particular requirement, solve *your* problem.

**DETROIT ELECTRIC FURNACE DIVISION**

**KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN**

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sau Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.


Sterling's
"THE WHEELS OF INDUSTRY"
STERLING
GRINDING WHEELS
Plus VALUE
ABRASIVE PRODUCTS
FOR
• BETTER GRINDI
• FASTER GRINDI
• LOW COST GRIND
THE STERLING ABRASIVE
OF THE CLEVELAN
BRANCHES . . BOSTON — CHICAGO — CLEVELAND — DETROIT

# "F" and "P" HIGH SPEED BONDS

## PROVIDE A QUICKER SOLUTION FOR FOUNDRY GRINDING PROBLEMS

Two Sterling Foundry Grinding Wheel bonds, each a product of Sterling's Research and Development Program, satisfy all high-speed foundry grinding demands. These two resinoid bonds–"F" and "P"–are distinctly a Sterling idea. When either is used in a wheel in proper combination with various kinds of abrasive grains, wheel structures, and grades, it provides the best possible foundry grinding. Being "tailor-made" to meet special applications, these wheels do specific jobs better, faster, and at lower cost.

In concentrating their efforts on perfecting these two bonds, Sterling technicians eliminated most of the time needed to select the proper wheel for your job. "F" or "P" Bonds "fill the bill" where other wheels demand a wider bond choice – hence, need more planning time – for producing the proper abrasive unit for floor-stand or swing-frame grinding.

The unusual efficiency built into Sterling Foundry Grinding Wheels provides many desirable features for users of these "Wheels of Industry." Deliveries can be made from our plant to you much more rapidly . . decisions as to special wheel formulas can be more quickly determined . . you can order and reorder with confidence in identical formulas being maintained.

Sterling's ability to turn out quickly the precise grinding wheel you need is important, and will become more so as emergency production continues. Sterling engineers can make immediate time-saving decisions as to the correct wheels for the solution of your grinding problems. Our modern manufacturing processes mean rapid flow of your order through our plant. A letter from you will bring expert cooperation at no cost or obligation. Write us and we will follow through at a fast pace.

## BEST IN THE TEST --- THAT'S STERLING

Exhaustive, competitive tests of Sterling Grinding Wheels are being held daily in leading foundries all over the country. Time after time, Sterling's "Wheels of Industry," because of faster, better, lower-cost grinding on high-speed portable, swing-frame, or floor-stand operations, eliminate all competition . . . lead the field!

Such test results are proof positive of Sterling's important contribution to breaking foundry production records . . . may we help you break records in your grinding departments?

## Send For These STERLING Research and Development Folders . . . .

These interesting folders describe the importance to you of Sterling's Research and Development Program and outline various grinding specifications for different types of tools and the entire range of metals. Also included is the popular, informative book, "The Art and Science of Grinding." Write today for your set of these folders . . . no obligation whatever.

## DIVISION • TIFFIN, OHIO

CARRIES COMPANY

LOS ANGELES — NEW YORK — DISTRIBUTORS IN ALL PRINCIPAL CITIES

# "Top charging on our two electric furnaces is like adding a third furnace!"

reports Newport Steel Corp., Newport, Ky.

Lectromelt* fast-opening furnace top in its charging position.

TWO OF NEWPORT STEEL'S 80-ton electric furnaces are equipped with the Lectromelt lift-and-swing top-charge feature; their third is door-charged. You have a comparison based on facts, therefore, in these production figures.

*Top charged furnaces have reached 4% more tonnage per heat, 30% more heats per month, and 36% more average monthly output than that of door charged furnaces.*

"You can't melt scrap in the stockyard", says the Superintendent of Steel Production. "Top charging lets you get scrap into the furnaces fast." Records show that Lectromelt top charging is accomplished here in half the time required for door charging, thereby helping to maintain high efficiencies and lower costs.

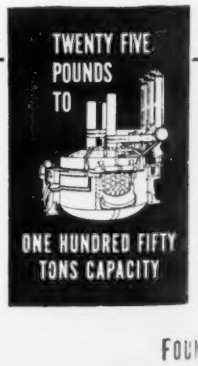
For Catalog No. 8 giving you more details on Lectromelt Furnaces, write Pittsburgh Lectromelt Furnace Corporation, 314 32nd Street, Pittsburgh 30, Pennsylvania.

**Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co. Ltd., Nagoya**

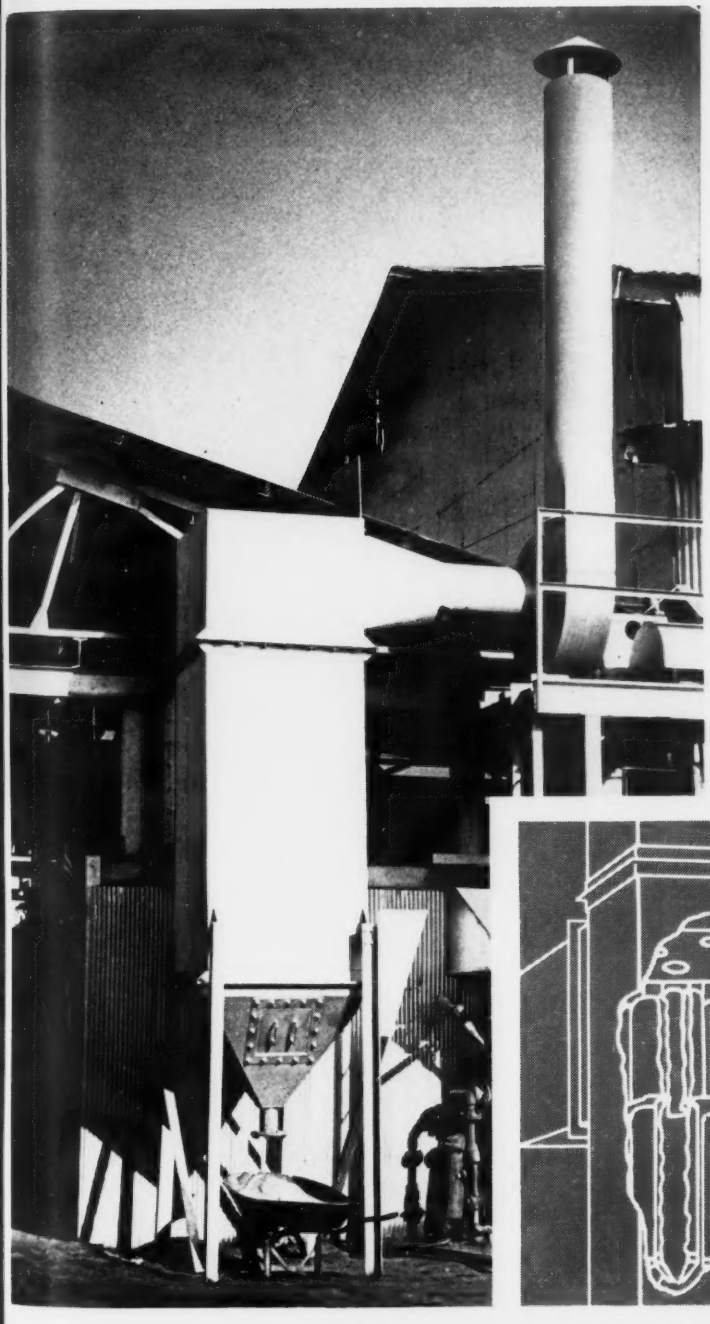
*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*



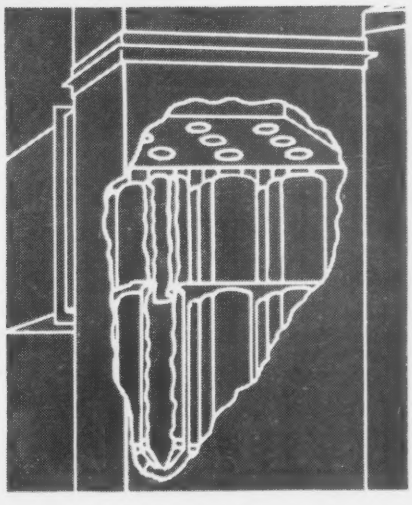
# WHIRLEX DUST COLLECTOR SOLVES SHOT-BLASTING DUST PROBLEMS AT SOUTHERN CAR & MFG. CO.



## DUST NUISANCE WAS SERIOUS HANDICAP TO WORKMEN IN FOUNDRY

When raw castings are completed at "Southern Car", they are moved directly to the shot-blasting room where high velocity shot-blasting is used to remove sand and scale. Formerly, the dust exhausting from the ventilating system caused a serious nuisance with frequent complaints from neighboring manufacturers. Dust blowing into the foundry made conditions very unpleasant for the workmen. After a discussion of the problem, engineers of The Fly Ash Arrester Corporation performed tests which proved that the highly efficient "Whirlex" MTSA-9CY18S multicyclone could eliminate the nuisance.

## NO COMPLAINTS FROM WHIRLEX'S DISCHARGE



Since the installation of the "Whirlex", the discharge from the process has been so light that no complaints whatsoever have been received from operation of the shot-blasting room. The "Whirlex" multi-cyclone dust collector is constructed of heavy steel cyclone units built into a flanged casing. Cyclone elements and collector casing are of 3/16" plate. This highly efficient collector is shipped in complete, all welded units with flanged connections. Erection is simply a matter of bolting these units into place.

*Write today for descriptive literature and the address of your nearest representative.*

**THE FLY ASH ARRESTOR CORPORATION**

**BIRMINGHAM ALABAMA**

202 North First Street

Telephone 54-6676

Why *Brass* can better serve your needs

*Unfailing* Dependability

BRONZE PARTS ARE ESSENTIAL FOR FIRE FIGHTING EQUIPMENT . . . .

Fire fighting apparatus and other emergency equipment must be ready to perform when the occasion demands. Well designed parts . . . pumps . . . valves and fittings are made of bronze to avoid performance failures. Pressure tightness, resistence to corrosion, strength, ductility and anti-frictional characteristics are some of the qualities required.

Wherever liquids are used . . . in the Home or Industry . . . bronze parts play a vital role.

FREE . . . Write for your copy of the 8-page Lavingot Technical Journal—Vol. 8, No. 4—containing an article discussing "Fume Control in the Brass Foundry."

*Specify*—LAVIN NONFERROUS INGOT—*Quality*

Brass · Aluminum · Bronze · Zinc Base Die Casting Alloys

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- *Producers of Zinc Base Die Casting Alloys*

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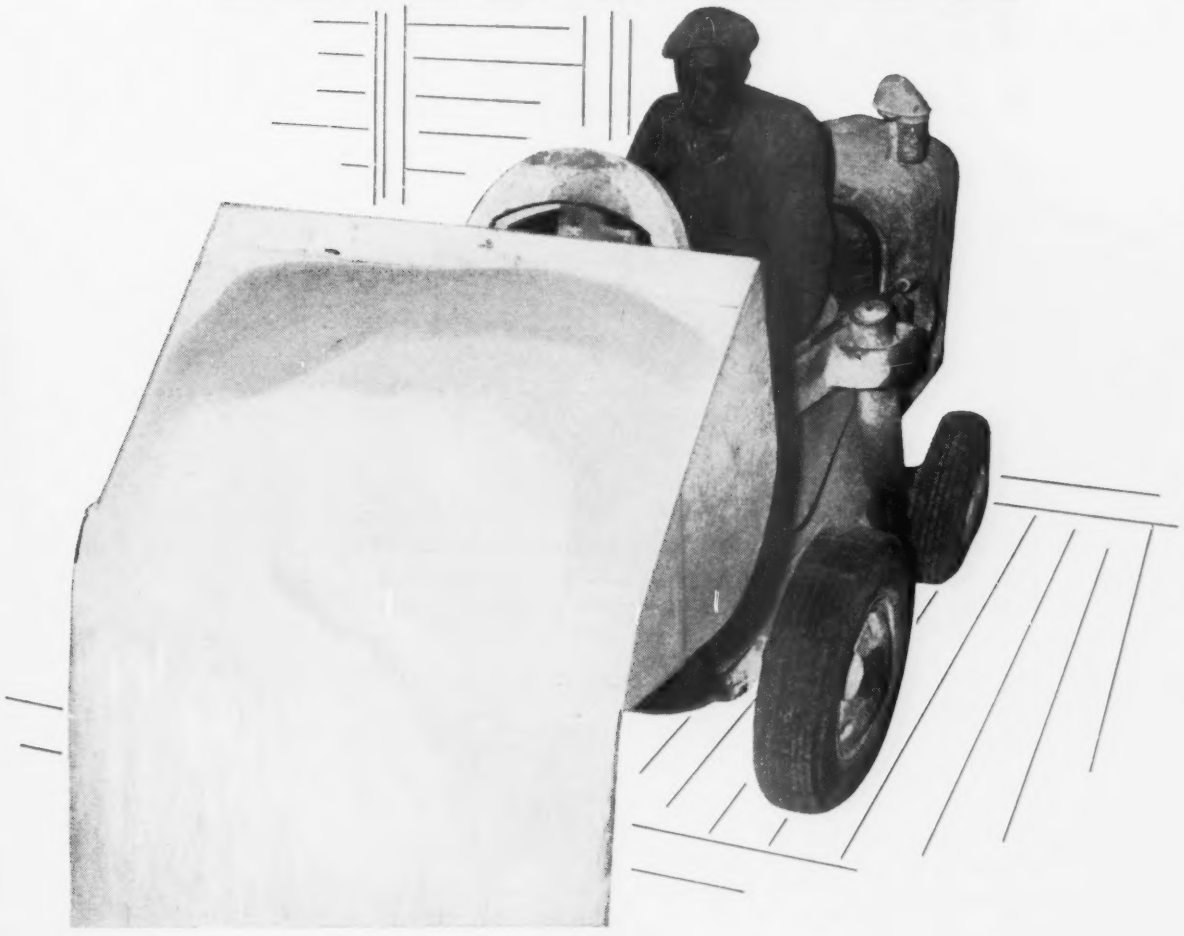
REPRESENTATIVES IN PRINCIPAL CITIES

R. LAVIN & SONS, INC. 1900 53 Years 1953 SERVING THE FOUNDRY INDUSTRY

# PAYLOADER



## *For Fast, Flexible* **BULK-MATERIAL** *Handling!*

"PAYLOADERS" spell flexibility and low-cost in the handling of sand and other loose, bulk materials in foundries and factories. And these versatile tractor-shovels can go to work cutting handling costs *right away.* No expensive investment or plant rearrangement is required before you begin reaping "PAYLOADER" benefits. They travel swiftly indoors and out and maneuver in close quarters. They scoop-up, carry, load, dump, spread . . . lift and lower . . . push and pull. They load and unload boxcars of sand and other bulk. In fact, "PAYLOADERS" are being used for so many jobs in so many plants that they can probably cut handling costs for you too. Get all the facts from your "PAYLOADER" Distributor or write The Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Illinois.

**FREE HANDBOOK**

**Tells how and where to look for signs of inefficient bulk-materials handling . . . how to analyze, organize and set up an efficient handling system. Plus many useful tables and data. Write for "Bulk Materials Handbook."**

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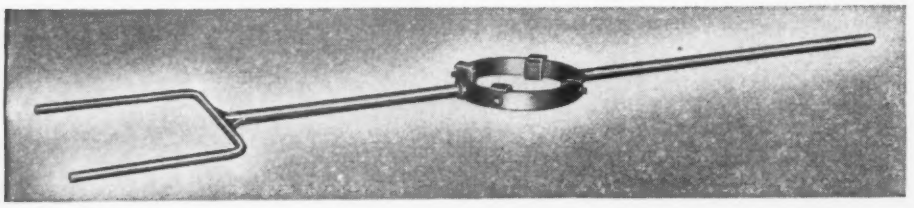
# NO. 1 SOURCE FOR

# Bowls · Shanks · Tongs

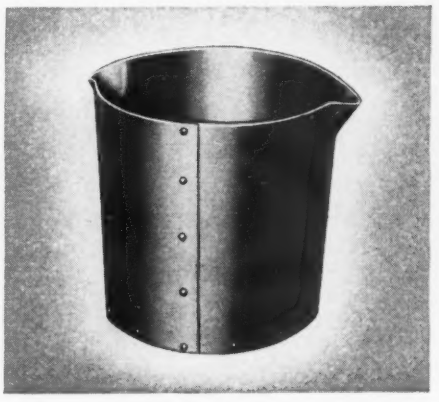
Industrial Equipment round bottom pressed steel ladle bowl, 50 lb. capacity, type 7 flat side.

Industrial Equipment round bottom pressed steel ladle bowl, 60 lb. capacity, type 14 circular.

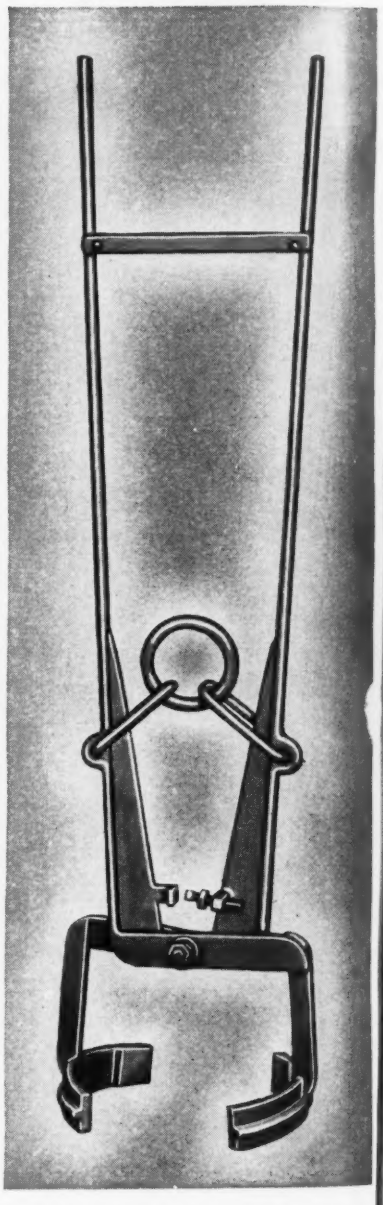


Industrial Equipment type 30CA single and adjustable ladle and crucible shank. Four-point suspension . . . easily adjustable . . . no springs . . . air cooled band. Fixed band types also available.

Industrial Equipment type 514 flat bottom welded steel ladle bowl. Available in almost any size or thickness.



Industrial Equipment 537 flat bottom riveted steel ladle bowl.



Type 72C crucible tongs. Adjustable. Four-point suspension. Claw types also available.

The above Industrial Equipment products, along with dozens of other types of bowls, shanks, tongs and ladles, are included in our latest catalog. *Write for your copy.*

LADLES

SHANKS

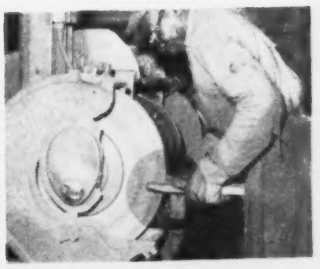
BOWLS

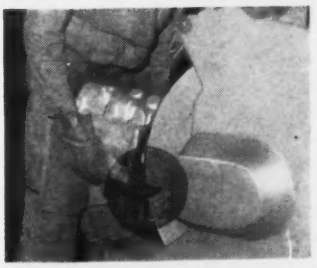
TONGS

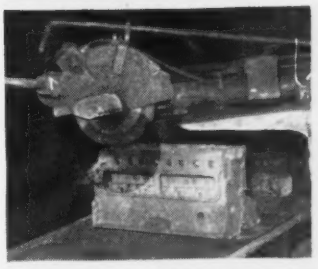
## Industrial
## EQUIPMENT COMPANY

115 NORTH OHIO ST., MINSTER, OHIO

# 3 ways CRYSTOLON* wheels add the "TOUCH OF GOLD" to gray iron grinding







1 In Norton CRYSTOLON wheels you get an abrasive with maximum hardness and sharpness for fast, economical grinding on a low-tensile-strength material like gray iron.

2 There's a CRYSTOLON wheel with a bond that's exactly right for every type of cleaning room job you do. That goes for everything — swing frame, floor stand or portable grinder — heavy or light grinding pressure, large or small contact areas, high or low speeds.

3 You can depend on CRYSTOLON wheels for consistent top performance — thanks to Norton's method of controlling grain spacing that assures uniform structure within wheels and from wheel to wheel.

That's how Norton CRYSTOLON wheels add value to gray iron castings as they do to everything they grind — providing the "Touch of Gold" that means lower cost grinding for *you*.

**Your Norton Distributor can help you**

Besides his own practical experience in grinding applications, your Norton Distributor can always call in a Norton Abrasive Engineer. They will be glad to study your grinding jobs and make recommendations for more efficient, more economical cleaning room operation.

Ask your Norton Distributor for Booklet 1405, or write us direct. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Inc., Worcester 6, Massachusetts.

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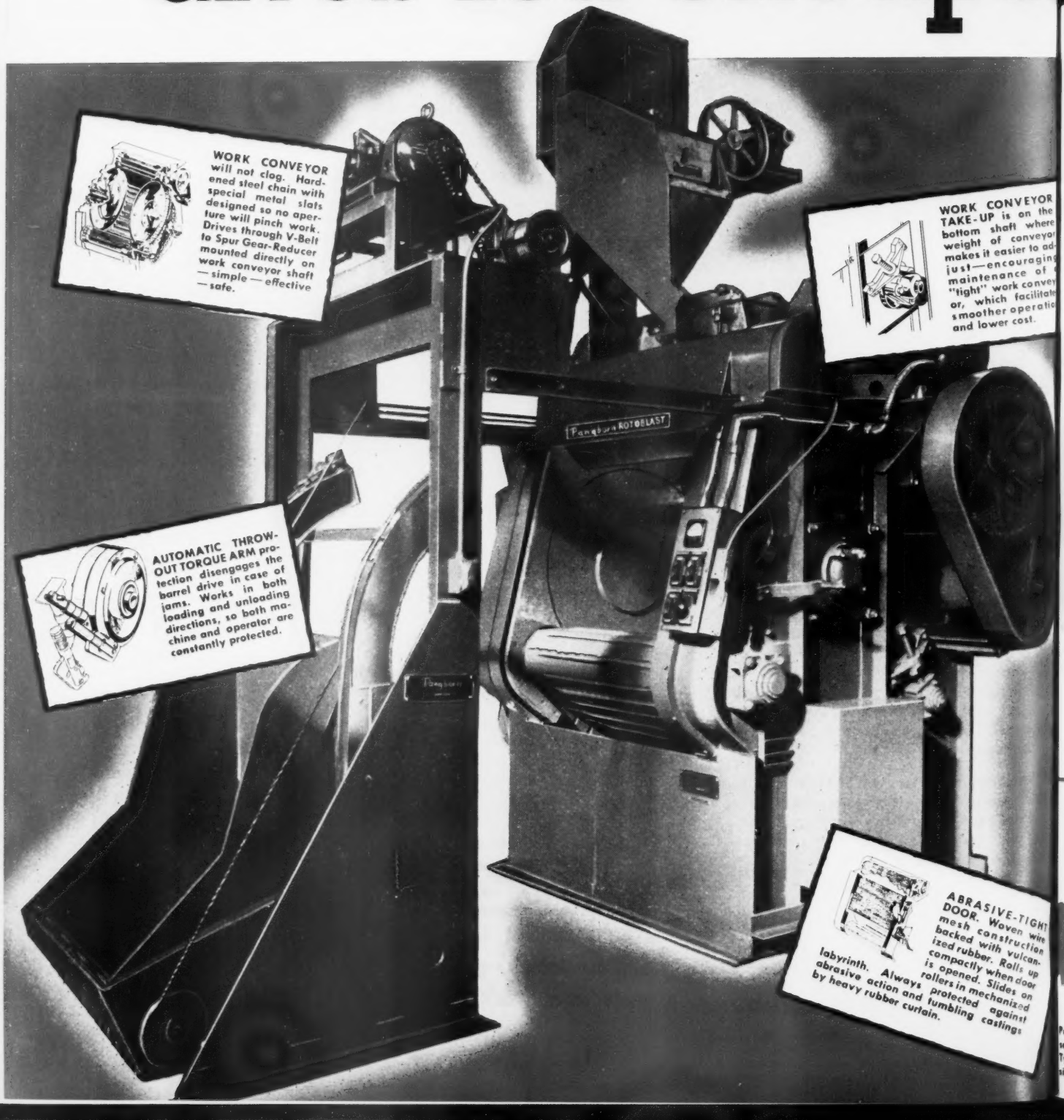
*Making better products to make other products better*

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

W-1436

# Here's Why Pangborn Gives You Cheaper


WORK CONVEYOR will not clog. Hardened steel chain with special metal slats designed so no aperture will pinch work. Drives through V-Belt to Spur Gear-Reducer mounted directly on work conveyor shaft — simple — effective — safe.
WORK CONVEYOR TAKE-UP is on the bottom shaft where weight of conveyor makes it easier to adjust—encouraging maintenance of "tight" work conveyor, which facilitates smoother operation and lower cost.
AUTOMATIC THROW-OUT TORQUE ARM protection disengages the barrel drive in case of jams. Works in both loading and unloading directions, so both machine and operator are constantly protected.
ABRASIVE-TIGHT DOOR. Woven wire mesh construction backed with vulcanized rubber. Rolls up compactly when door is opened. Slides on rollers in mechanized labyrinth. Always protected against abrasive action and tumbling castings by heavy rubber curtain.
Pangborn ROTOBLAST

# Blastmaster Barrel

# Better, Faster Cleaning

Ever since the new Pangborn Blastmaster ROTOBLAST® Barrel went on display at the 1952 Foundry Show, it has proved itself in quality of work, speed of operation, and economy of performance. The foundry that purchased the Foundry Show model has more than doubled its cleaning output per man-hour! Other firms that have installed the Blastmaster during the past year have discovered for themselves how efficient and money-saving it is. And no wonder! Look at Blastmaster's exclusive features shown on the opposite page! And Blastmaster utilizes the famous ROTOBLAST that saves you money five ways:

- **SAVES LABOR** with push-button operation
- **SAVES SPACE** because machines are compact
- **SAVES TIME** by cleaning more loads a day
- **SAVES POWER** since no compressor is needed
- **SAVES TOOLS** because all scale is removed

**IF YOU'RE INTERESTED** in better, faster, cheaper blast cleaning, find out more about the Pangborn Blastmaster Barrel. Available in 4 sizes—3, 6, 12, and 18 cu. ft. capacities. For other equipment in the famous Pangborn line, see illustrations elsewhere in this ad. For more details, write for Bulletin No. 223 (Blastmaster Barrel) or No. 214 (all ROTOBLAST equipment). Address PANGBORN CORP., 1400 Pangborn Blvd., Hagerstown, Md.

**OVER 28,000 PANGBORN MACHINES SERVING INDUSTRY**

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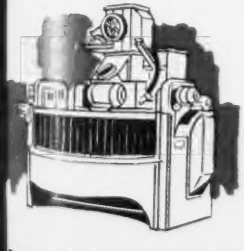
# Pangborn

*Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment*

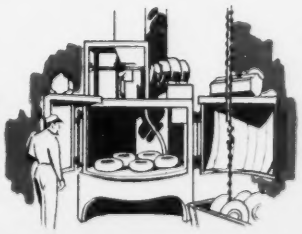
## BLAST CLEANS CHEAPER

**with the right equipment for every job**

**PANGBORN HAS EVERYTHING YOU NEED IN BLAST CLEANING & DUST CONTROL EQUIPMENT**

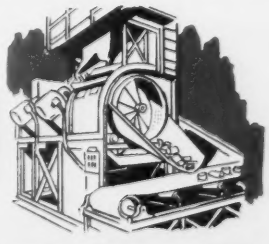


Pangborn ROTOBLAST Tables for semi-continuous blast cleaning. Types and sizes for castings of all sizes and shapes.

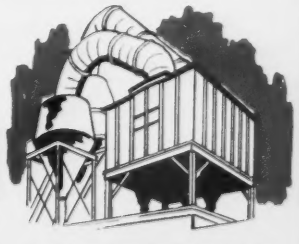


Pangborn ROTOBLAST Table-Rooms for general-purpose blast cleaning. An extremely efficient machine for jobbing foundries.

Pangborn Hydro-Sand Blast Rooms for simultaneous blast cleaning and core-removal.



Pangborn "Continuous-Flo" ROTOBLAST Barrels for cleaning a steady flow of miscellaneous work at high rate of production.



Pangborn Dust Control equipment for every purpose traps dust at the source, saving money and improving work conditions.

Crucible's SAN-BLO Pulsator (model 40-P-2) blows cores weighing up to 40 lbs. each, in wood or metal boxes. Its 6″ draw table, plus the fact that the sand magazine is never changed and the blow plate seldom changed, keeps adjustment time to an absolute minimum. Photo shows the SAN-BLO in action blowing 10 lb. caster swivel bracket cores in a wooden box, using oil sand with 5 p.s.i. green strength. Blown cores can be seen on conveyor behind operator. Production rate, 60 cores per hour. Note the overhead sand system which feeds sand into hopper of the SAN-BLO.

# Crucible Steel Casting Co. is "reducing core costs immensely" with the SAN-BLO PULSATOR

JOSEPH HRABAK
Core-room Foreman

**THE CRUCIBLE STEEL CASTING CO.**
OF CLEVELAND
**HIGH-GRADE ELECTRIC STEEL CASTINGS**
ALMIRA AVENUE AND WEST 84TH STREET
**CLEVELAND, OHIO**

January 20, 1953.

Federal Foundry Supply Company
4600 East 71st Street
Cleveland 5, Ohio

Gentlemen:

We are happy to report that no other equipment in our Core-room has given us as much satisfaction as your "San-Blo Machine."

At present we are using all oil sand, but have found we can also use a dry binder mix as we have blown a number of cores with dry binder mixes without any difficulty. A green compression strength of 6-7 P.S.I. on all dry binder mixes.

With the "San-Blo" we do not need as many vents on core boxes, in fact on some none are required at all. Since 50% of our core boxes are made of wood with very little or no re-enforcing, we are able to run them on your machine without any trouble whatsoever.

We are a jobbing shop where the work consists of short runs, which requires fast changing and having a universal blow plate instead of a separate plate for each individual job, your machine is ideal.

Our sand is supplied by an overhead belt with a hopper feed which eliminates a helper, thus saving the coremaker valuable time.

Since the installation of the "San-Blo" machine, we have been able to increase our production with fewer coremakers, thus reducing our core costs immensely.

Very truly yours,

THE CRUCIBLE STEEL CASTING COMPANY

Joseph Hrabak

Joseph Hrabak, Core-room Foreman

JH:LS

**Write for SAN-BLO Catalog P-1 and learn how your foundry, too, can turn core making into core production to cut core costs! SAN-BLO Pulsator models are available for blowing cores weighing up to 250 lbs.—in wood or metal boxes—using any core sand you can ram.**

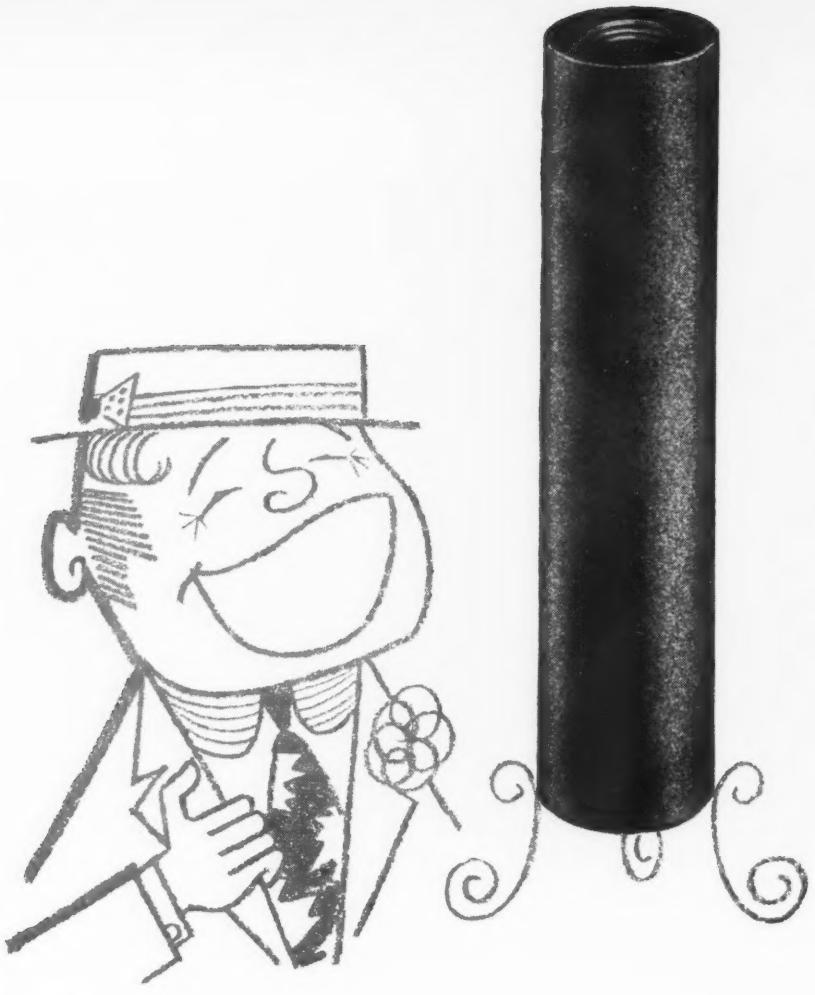
FEDERAL

MEMBER FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION FEMA

The **FEDERAL FOUNDRY SUPPLY** Company

4600 EAST 71st STREET, CLEVELAND 5, OHIO

SALES OFFICES: CHATTANOOGA · CHICAGO · DETROIT · LOS ANGELES · MILWAUKEE · NEW YORK



**PERFORMANCE CLAIMS** call for proof—especially when the subject is electrodes. You can make electrodes with every one of the features you know they should have—controlled density, uniform structure, high mechanical strength, low electrical resistance. And you can be pretty sure they'll give top performance. But to be *really* sure you have to get *on-the-job proof*. At IGE that's just what we do. Before we put any new-type electrode into production, we first put it into actual electric-furnace operation. We test it, we study it, we learn everything there is to know about its behavior. That way, when we make *our* performance claims, we're not just guessing. We know IGE electrodes produce higher tonnages. We know they last longer. And we know we can say to you, with perfect confidence: Specify IGE!

**INTERNATIONAL GRAPHITE IGE & ELECTRODE DIVISION**

**SPEER CARBON COMPANY**

**St. Marys, Pennsylvania**

*Other Divisions:* Jeffers Electronics • Speer Resistor

# THIS EXTRA-DENSE POWER-PRESSED CUPOLA BLOCK is the industry's NEW "HEAVYWEIGHT CHALLENGER"!

*That Kentucky flint clay is tops for "staying power"*

**PUT THE KAYO ON HIGH COST OF RELINING!**

Ironton's new block contains more clay and it's "conditioned" to take more punishment without failing. See a sample soon.

**WITH IRONTON BLOCK IN YOUR CUPOLA** you can stretch the time between linings, and reduce your daily operating costs. Ironton's Kentucky clay is better than ever; NOW de-aired on latest type vacuum equipment and POWER PRESSED. You get a denser block, with lower porosity and no internal cracks. This heavier block has extra resistance to abrasion, more resistance to slag and metal. You get tight-fitting joints because every block is true to size and shape. Our Bulletin 101-H shows all sizes available; call or write for your copy.

**WE WILL PAY FOR YOUR PHONE CALL** when you want to get detailed information without delay. There's an "answer man" at

**Ironton 109**

RELIABLE REFRACTORIES

THE IRONTON FIRE BRICK COMPANY
IRONTON, OHIO

BERLITE • RAVENITE
CARO-LINE • NOJOINT • ALSET • GUN-ON
KENTUCKY FIRE CLAY BRICK • SPECIAL SHAPES

*The Mute Swan is not a native bird, having been introduced from Europe. Nor is it mute, for when angry it hisses and when calling its young it makes a noise similar to the bark of a small dog. In England, the swan is regarded as a royal bird and ownership must be approved by the crown. This is an ancient custom, enacted in 1482 during the reign of Edward IV. To this day, the swans on the Thames belong to the crown and two city companies, all three having distinct "swan-marks" on their respective birds.*

The Mute Swan, the swan of our parks and country estates, is another of Nature's families distinguished by identical appearance. This uniformity is especially noticeable when a group of swans, such as shown here, gathers at the edge of a lake or glides with ease and grace over the water.

HINES Pins and Bushings, too, are noted for uniformity. Carefully machined from the finest steel, hard chrome plated and precision ground to .002″ tolerance, they possess accuracy and uniformity rarely, if ever, found in nature. For pins and bushings that assure quick, accurate alignment, won't rust, don't require lubrication—pins and bushings that will give exceptionally long, satisfactory service—it's HINES!

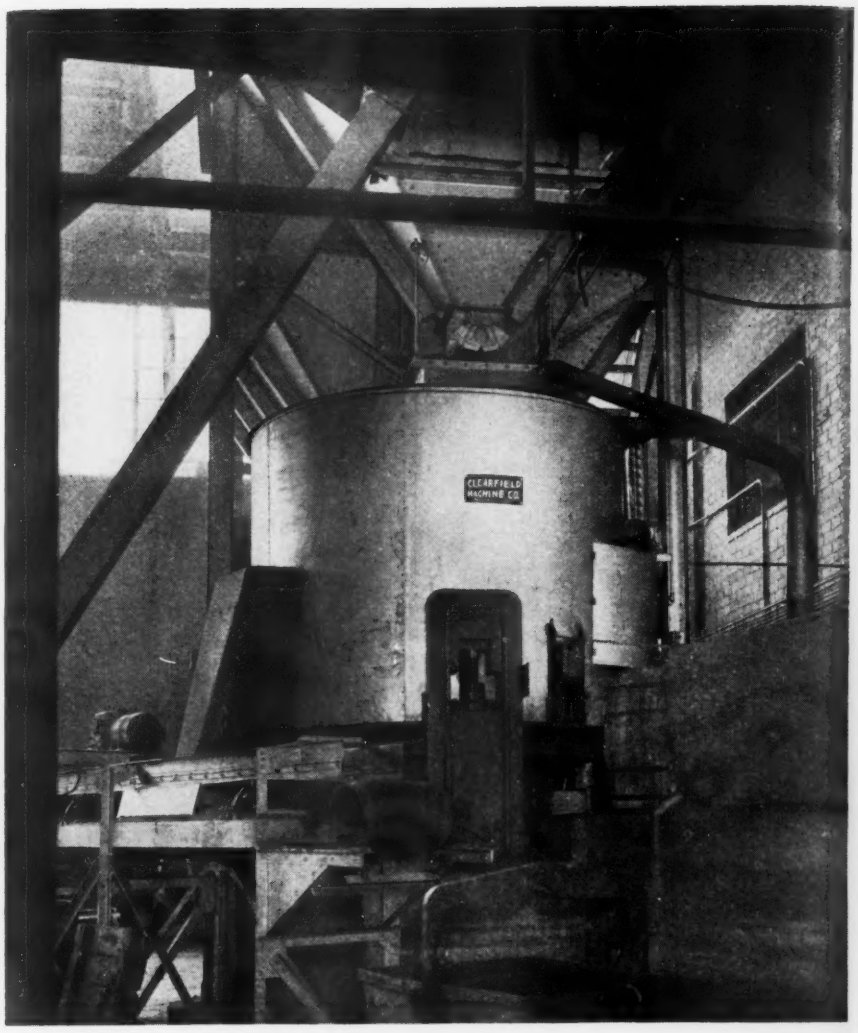
**PINS AND BUSHINGS**

THE HINES FLASK CO.,

3431 WEST 140TH STREET, CLEVELAND 11, OHIO • TELEPHONE: ORCHARD 1-2806

you get
better
foundry sand
from a

# CLEARFIELD
MIXER




*This Clearfield 930 Mixer is the center of a complete molding sand conditioning system.*

Sand which adheres firmly during both molding and pouring operations must have bond and moisture uniformly distributed. This is absolutely essential for good foundry work—and that's the type of sand which is turned out all the time by Clearfield Mixers

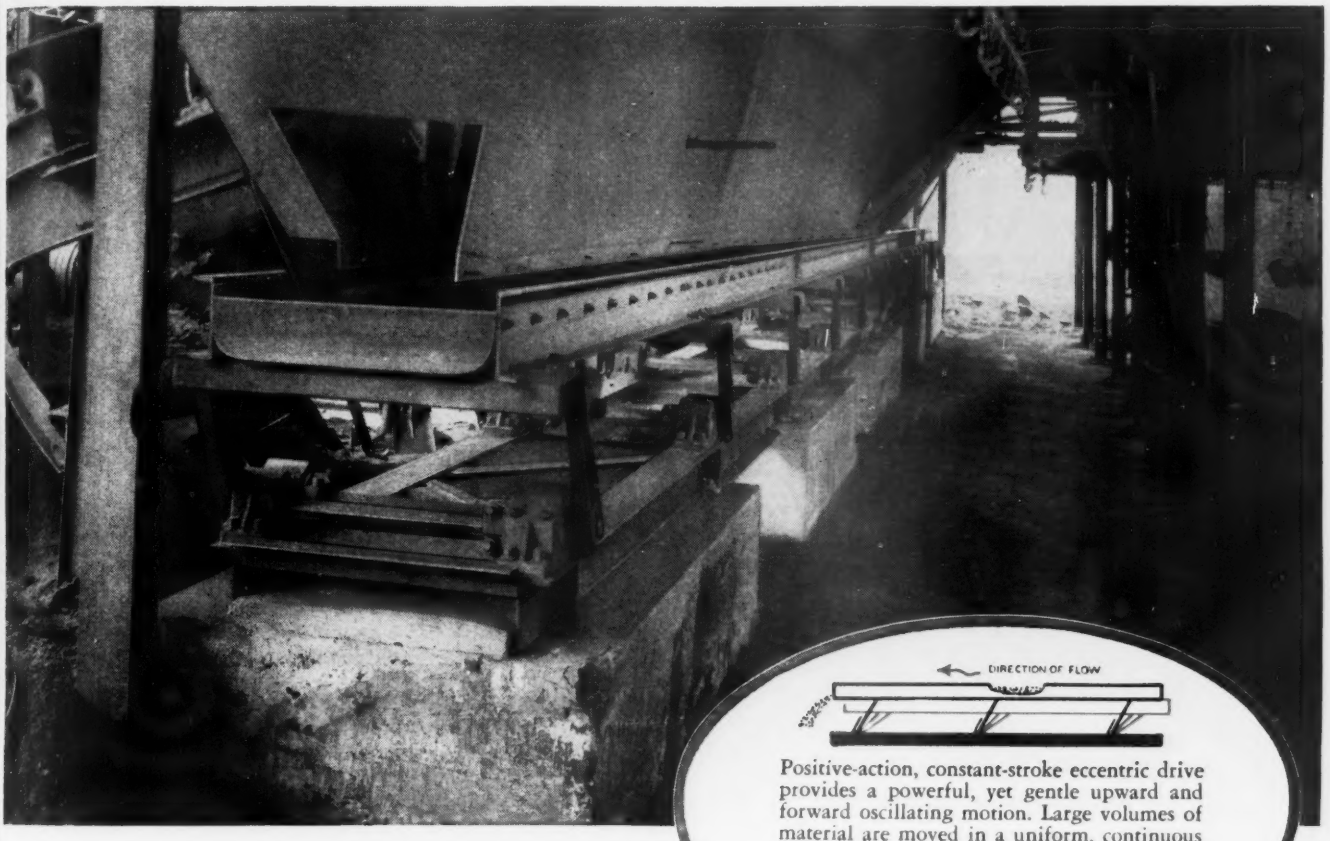
Clearfield Mixers, with the famous revolving pan and vertically rotating mullers, are available in sizes and models to fit in perfectly with any production setup. So whether your needs are for small quantities of sand at infrequent intervals or a continuous large supply, write for Catalog No. 79 for complete information on the Clearfield Mixer which you require.

CLEARFIELD
MIXER

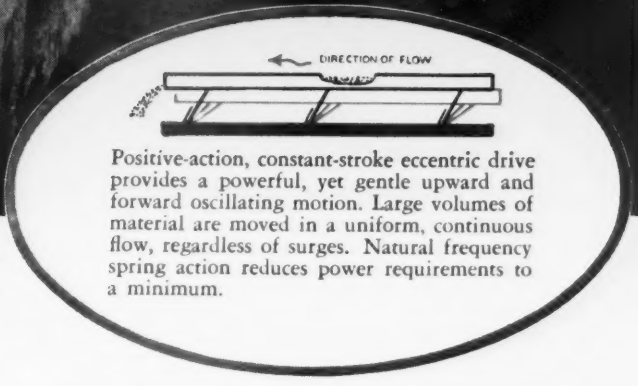
MIXES, TEMPERS
AERATES

CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U. S. A

# LINK-BELT Oscillating Conveyors pay for themselves in one year's maintenance savings!



Using oscillating conveyors, Lakey Foundry requires fewer handling units. Both conveyors in service are 30 in. wide. The one shown here is 90 ft. long. The second is 55 ft. in length, with a screening section to separate and reclaim rods, gates and sprues, from sand.




Positive-action, constant-stroke eccentric drive provides a powerful, yet gentle upward and forward oscillating motion. Large volumes of material are moved in a uniform, continuous flow, regardless of surges. Natural frequency spring action reduces power requirements to a minimum.

**Lakey Foundry eliminates costly shutdown time and manhours handling hot sand and sprues**

FOR many years Lakey Foundry, Muskegon, Mich., has had the problem of handling refuse, clean up sand and rods, gates, sprues and hot core sand. They attempted to solve this problem with other equipment which proved messy and costly. The installation of two all-metal, positive-action Link-Belt Oscillating Conveyors proved to be the answer.

Not only have the conveyors ended the frequent expensive shutdowns formerly experienced, costly jams have been eliminated. The modern, jamproof operation saves maintenance costs that each year approximated the new conveyors' price.

Foundries all over the country are switching to Link-Belt Oscillators. These minimum-maintenance, long-life conveyors are ideally adapted to handling hot sand and castings. Their compactness saves valuable space. And they can easily be made dust-tight if desired.

Yes, on many counts, Link-Belt positive-action Oscillating Conveyors are years ahead. For full details, contact your nearest Link-Belt office or write for new Book 2444. 13,049

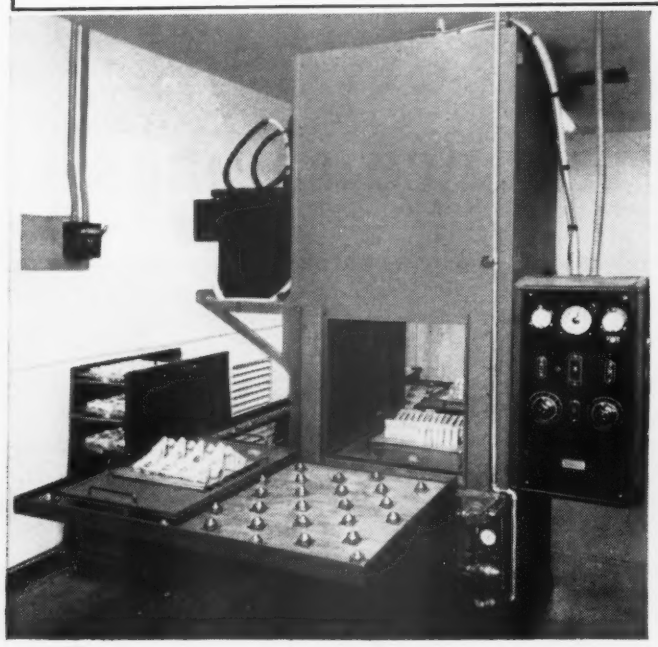
LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

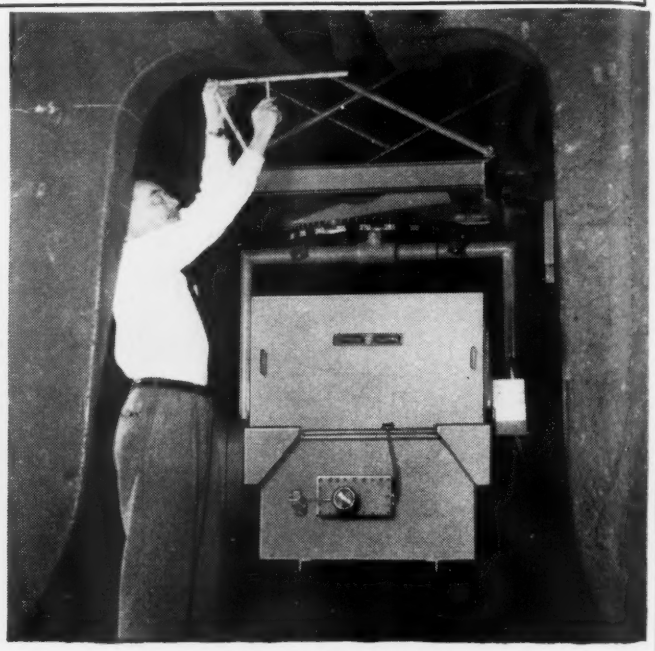
MEMBER FEMA

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities.

## From aluminum castings... to battleship anchors...



Low-voltage OX-140 X-Ray Unit



High-voltage Industrial Betatron

# GE builds x-ray units in 25 models to match your quality control needs

**For fast, accurate, non-destructive testing and inspection — industry looks to GE X-Ray**

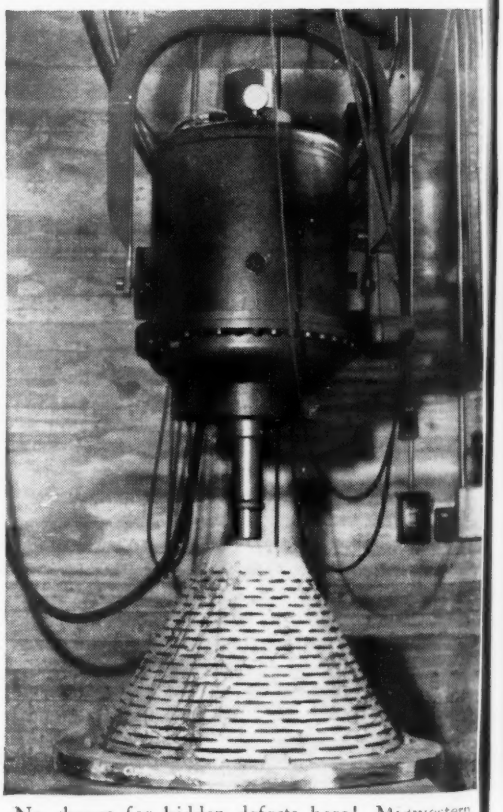
No matter what your quality control requirements — from thin sections of light metals to heavy section thicknesses of steel — there's a General Electric x-ray unit that's right for your job. Choose from units rated at 140,000, 250,000, 400,000 volts . . . 1, 2 and 15 million volts.

These compact, completely shockproof units can be yours in a wide choice of models for floor, wall or ceiling-mounting. Some are mobile, some portable . . . ready to be moved on a moment's notice to widely separated locations. Others in production-line housings are semi-automatic for continuous inspection of production lots or of raw materials.

Chances are, there's a place in your manufacturing process where x-ray can lower production costs and improve quality. Let one of GE's highly trained specialists appraise your inspection needs. For complete information, write X-Ray Department, General Electric Company, Milwaukee 1, Wisconsin, Rm. YY-4.

*You can put your confidence in —*

GENERAL ELECTRIC



No chance for hidden defects here! Midwestern steel company uses million-volt GE Resotron for fast, accurate inspection of a complicated casting.

# *How B&W ALLMUL cuts severe service refractory costs*

## LEAD DROSS FURNACE

**"ALLMUL proves more economical than any refractory tried!"**

A plant with several reverberatory type smelting furnaces, used to melt alloys of lead, tin and antimony, carried on an extensive investigation to obtain economical refractory linings. Practically every type of refractory was tried. Side-by-side tests in the same furnace proved the economy of B&W Allmul over all others. Result? Allmul is now standard for these furnaces.

## CONTINUOUS WELD PIPE FURNACE

**"Three times the life in worst wear areas!"**

A large manufacturer was troubled by the short life of kyanite-base refractories in certain areas of his furnace. Then B&W Allmul were installed in the uptake arches, a critical, severe-service area. Result? Allmul lasted three times as long as previously used refractories and has been ordered for general use in all areas of this manufacturer's furnaces of this type.

## INDIRECT ARC FURNACE

**"All furnaces converted to ALLMUL after comparative tests"**

A large company making alloy steel castings has several indirect arc furnaces melting various alloys, with pouring temperatures varying from 2700F to 3100F. With highest temperature alloys, semi-mullite brick burned out in 6 to 10 heats. B&W Allmul, which cost approximately the same, showed no appreciable wear after 20 heats. On alloy steels in general, this customer reports far-less slag formation (an indication of reduced refractory wear) with Allmul than with any other refractory used. Result: All furnaces are being relined with B&W Allmul Firebrick.

## ELECTRIC FURNACE ROOF

**"ALLMUL lasts 3 to 6 times as long"**

In a six-ton electric furnace, handling 15 tons of stainless steel per charge, super duty firebrick had to be replaced every 20 to 40 heats. Pouring temperature of the metal was in excess of 3100F, with higher temperatures attained in the furnace during periods of oxygen introduction. The owner installed B&W Allmul Firebrick, hoping for a life of 80 heats. Allmul in the first roof lasted for 122 heats—42 more than hoped for. The second roof of Allmul went to 131 heats! Result? Further orders for Allmul.

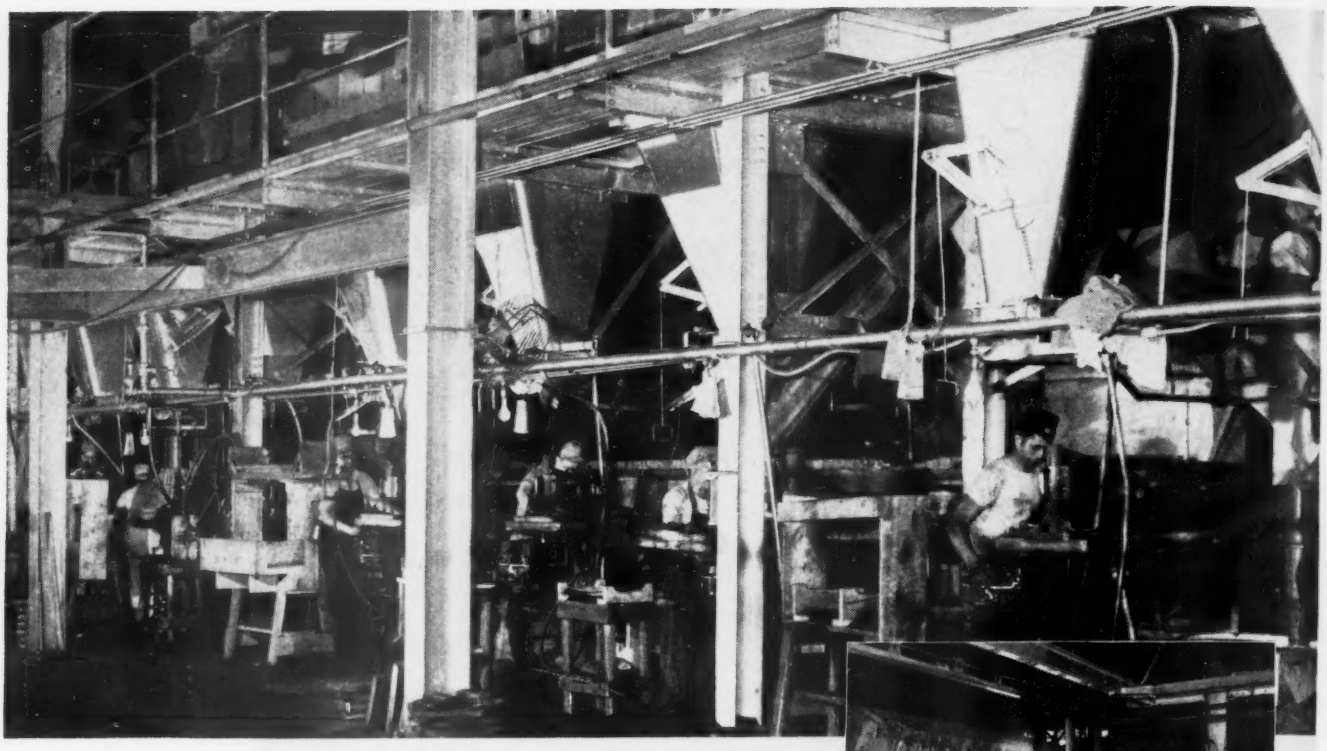
**Yes, the facts about B&W Allmul Firebrick speak for themselves. This fused-mullite brick is proving its economy in dozens of severe service applications. The reason? A unique combination of refractory properties—high hot load strength, high resistance to spalling, good volume stability, a high melting point of 3335F—all resulting in lower furnace costs. Want more data? Write for Bulletin R-29.**

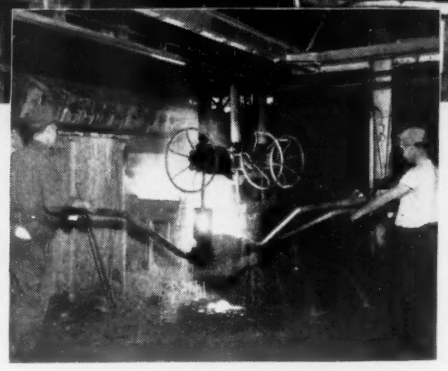
**BABCOCK & WILCOX**

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES 161 EAST 42ND ST. NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R-449

**B&W REFRACTORIES PRODUCTS — B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment . . . Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings**





***Knight Foundry Services include:***

**Foundry engineering**

**Survey of facilities**

**Foundry design**

**Construction**

**Mechanization**

**Modernization**

**Materials Handling**

**Production Control**

**Cost Control**

**Industrial engineering**

**Wage Incentives**

**Organization**

**Management**

## Knight-Engineered MODERNIZATION PROGRAM IS INSTALLED WITHOUT INTERRUPTING PLANT OPERATION—AND RESULTS IN INCREASED OUTPUT OF 33⅓%

This successful program was put into operation—step by step—without substantial interference to existing production. Continued operations during the modernization process were made possible by careful scheduling of necessary changes.

Modernization was accomplished without an increase in floor space and resulted in improved product quality, better working conditions, and a stronger competitive position for the company.*

**This plant is a good place to work.**

***Whatever your industrial problem, you'll benefit by the broad experience of Knight Engineers. For prompt attention, call our Chicago or New York office.***

**Name supplied upon request.*

EVIDENCE OF EXPERIENCE

# Lester B. Knight & Associates, Inc.

*Management, Industrial and Architectural Engineers*

MEMBER OF THE ASSOCIATION OF CONSULTING MANAGEMENT ENGINEERS, INC.

600 W. Jackson Blvd., Chicago 6

*Eastern Office—Lester B. Knight & Associates, 50 Church St., New York City 7*

# Progressive foundrymen everywhere use

# MALLEABRASIVE®*

(SHOT AND GRIT)

## FOR BETTER CLEANING

**"We have found that the finish obtained on our steel castings is much to be preferred to that obtained from ordinary shot."***

***West Michigan Steel Foundry Co., Muskegon, Mich.**

Malleabrasive cleans better, gives a brighter finish to your castings. That's because it's made by an exclusive process, laboratory tested and controlled to meet exacting standards. Malleabrasive does the toughest cleaning jobs . . . provides the right finish for galvanizing and other coatings.

## FOR FASTER CLEANING

**"Malleabrasive not only gave a very satisfactory finish but actually cleaned 12.4% more tonnage per hour."***

***Ohio Brass Co., Mansfield, Ohio**

Malleabrasive produces more clean castings in a given time because it cleans quickly and results in less down-time. Easier on machine parts and longer wearing, Malleabrasive cuts your maintenance time for parts repairs and refilling abrasive . . . speeds up production.

## FOR CHEAPER CLEANING

**"Our shot cost per ton cleaned has been reduced over 45% and our replacement parts cost has been reduced 70%."***

***Brewer-Titchener Corp., Cortland, N. Y.**

Malleabrasive gives you the lowest overall cleaning costs you've ever had. Down-time is reduced, parts replacements are fewer, Malleabrasive lasts 2 to 4 times longer, and more tonnage is cleaned — no wonder progressive foundrymen everywhere always specify Malleabrasive!

AND PANGBORN can prove these claims! Pangborn will test Malleabrasive in your plant for 30 days, *at no cost to you*. Your work schedule will continue uninterrupted while this test is being run. After 30 days you'll see for yourself that our claims for Malleabrasive are true. Let Pangborn engineers run this impartial test in *your* shop! For more information, write to: PANGBORN CORPORATION, 1400 Pangborn Boulevard, Hagerstown, Maryland.

**Malleabrasive Guarantees Lower Cleaning Costs and Better Cleaning Jobs Than Any Other Abrasive!**

Packed in orange striped 100-pound bags

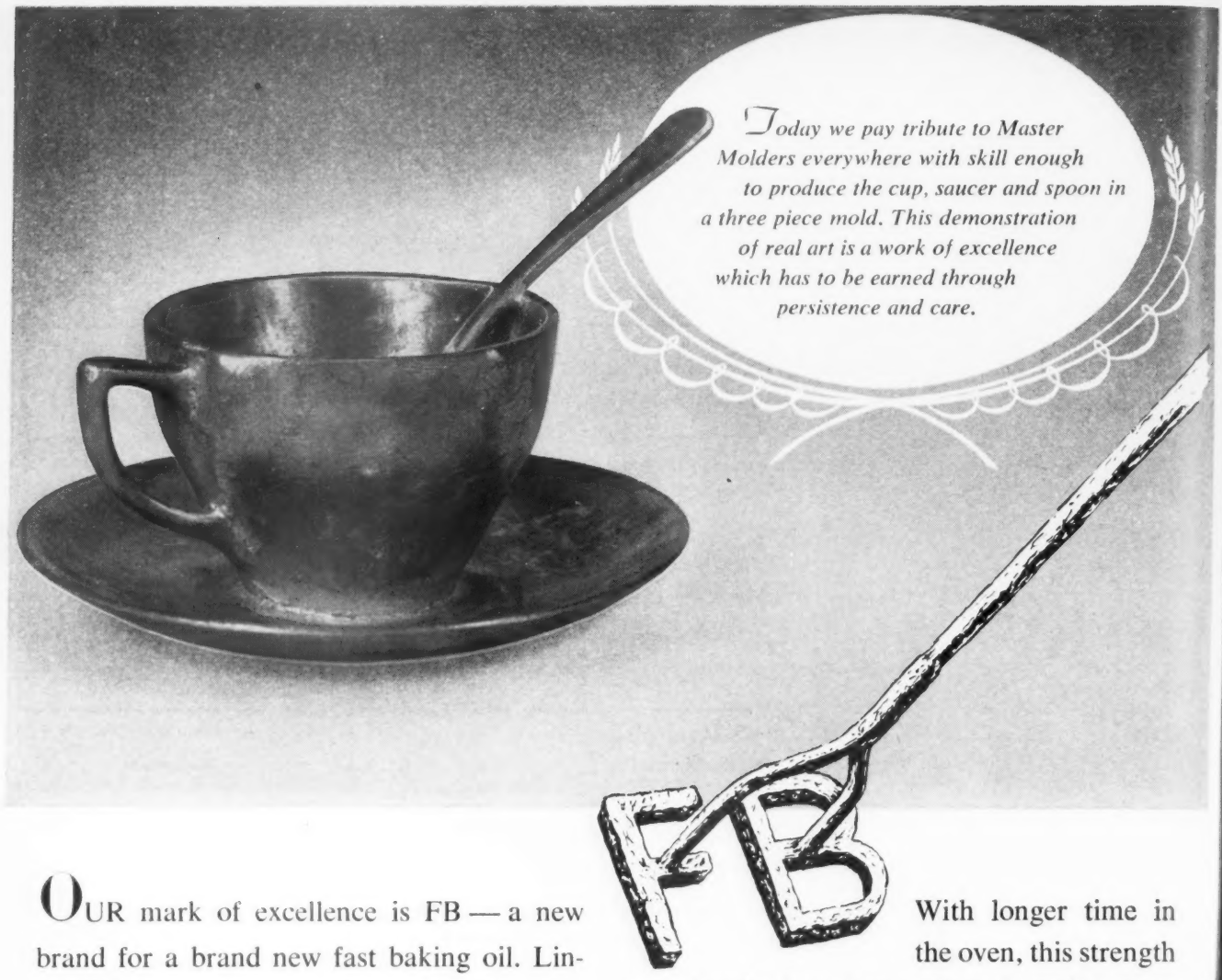
*Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment*

**Pangborn**

**BLAST CLEANS CHEAPER**

**with the right equipment for every job**

*U.S. Patent #2184926 (other patents pending)


Today we pay tribute to Master Molders everywhere with skill enough to produce the cup, saucer and spoon in a three piece mold. This demonstration of real art is a work of excellence which has to be earned through persistence and care.
FB

OUR mark of excellence is FB — a new brand for a brand new fast baking oil. Linbond FB and Korbond FB are miracles for strength and speed in a fast oven. They add that extra punch to the old ovens needed to meet heavy loads and keep new production geared to foundry schedules. Linbond FB 72 is one of these oils, and tensile cores made with it will develop good working strength with a 30 minute bake at 400°F. With longer time in the oven, this strength is maintained so that a plotted tensile curve looks more like a straight line than an arc. Also when Linbond FB 72 is used, 60 minutes in a hot oven will thoroughly bake chunk cores up to 8″ thick, while 4″ cores will show good center hardness in 30 minutes. These oils are worth considering as an answer to core room problems. Write us for a folder on the new FB line.

*The cup, saucer and spoon above is shown through the courtesy of Ray Carter, General Foreman, Molding Dept. Pontiac Motor Div., G. M. It's his work and beautifully done. For Pat Dwyer's story on this kind of casting, see his article in the May 1951 issue of "Foundry".*

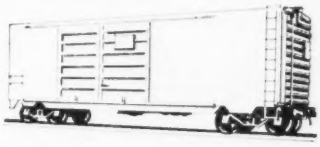
**UNITED OIL MFG. COMPANY**

1429 WALNUT STREET, ERIE, PA.

# 100,000 Freight Cars Built in the *Birmingham District*

## Pullman-Standard
CAR MANUFACTURING COMPANY

All 13 railroads serving Alabama have bought freight cars built by Pullman-Standard, Bessemer, Alabama.



ATLANTA & WEST POINT RAILROAD

ATLANTIC COAST LINE RAILROAD

BIRMINGHAM SOUTHERN RAILROAD

CENTRAL OF GEORGIA RAILWAY

GEORGIA RAILROAD

GULF, MOBILE & OHIO RAILROAD

ILLINOIS CENTRAL RAILROAD

LOUISVILLE & NASHVILLE RAILROAD

NASHVILLE, CHATTANOOGA & ST. LOUIS RAILWAY

SEABOARD AIRLINE RAILROAD

ST. LOUIS - SAN FRANCISCO RAILWAY

SOUTHERN RAILWAY SYSTEM

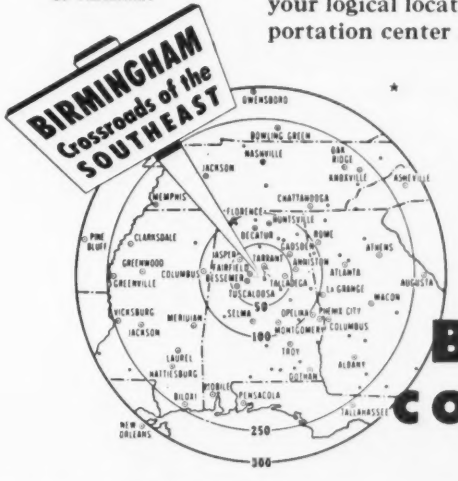
WESTERN RAILWAY OF ALABAMA

PULLMAN-STANDARD'S efficient plant at Bessemer, Ala., is the world's largest individual producer of freight cars. Its production line can turn out a completed freight car every 10 minutes of a working day. And in its brief history, 100,000 cars—mostly for the railroads of the South—have rolled from its yards.

Summarizing reasons why the Pullman-Standard plant has prospered, Vice President Fred O. Reemer says:

***"The Birmingham district was a 'natural' for our enterprise. It is the railroad hub as well as geographic center of the Southern region and originates more freight tonnage than any other point in the South. In this area almost everything we need to build a freight car is produced, including steel plates, axles, rivets, bolts, chilled iron wheels and lumber. In all we buy about $14 million of materials a year locally. However, there are some important items we still must obtain elsewhere. Here, too, we have a large reservoir of industrially trained labor; superior railroad connections and service and a community that always has been 100% cooperative with private enterprise."***

Mounting tonnage for Southern railroads, more business for heavy industry is being created by the tremendous development of this district and the South. If you plan a plant, warehouse or office to serve growing Southern markets to the best advantage, your logical location is the Birmingham area—workshop and transportation center of the Southern States.




***The Birmingham Committee of 100 or any of its members listed below invites you to write for specific information relating to the manufacturing and distributing opportunities in the Birmingham district for what you make or sell. Your inquiries will be handled promptly and in strict confidence.***

## BIRMINGHAM COMMITTEE OF 100

1914 Sixth Ave., N., Birmingham, Ala.

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Tenn. Coal & Iron Div.
United States Steel Co.

operating and maintenance costs go down

# with BS&B Foundry Flasks

## PRODUCTION PATTERN AND FOUNDRY CO.

**Chicopee, Massachusetts**

This grey iron, jobbing foundry in the busy New England area has been a BS&B customer for some eight years. That section of their plant pictured shows some of the BS&B Foundry Flasks which have been in service for over 5 years. The Production Pattern and Foundry Co. is just like any other foundry in one respect — they're in business to make money. They know the best way to start is by keeping operating and maintenance costs to a minimum. They have found that BS&B Foundry Flasks not only insure good castings but that they're practically maintenance-free as well . . . that in the long run they cost less to own and to use.

**Write for FREE BS&B Foundry Flask Handbook** A handy catalog and useful foundryman's "Bible"—includes valuable information on foundry flasks and easy-to-order system.

**To resist corrosion** BS&B Flasks may be coated with ZINCILATE at a slight additional cost at time of fabrication.

...and for heavy, tough castings you'll want the BS&B Heavy Duty Flask—the only foundry flask combining all these features...

1. **Welding of bearing strips continuously, both inside and out.**
2. **Cast steel trunnions.**
3. **Cast steel pinlugs and clamplugs.**

BS&B methods of corner forming of walls and bearings separately, plus welding bearings to walls, both inside and out, eliminates corner stresses, preventing the corners from cracking and breaking out.

FOUNDRY
OUR 60TH YEAR
BS&B
FLASKS

**BLACK, SIVALLS & BRYSON, INC.**

Foundry Flask Division, Dept. 7-AR4

7500 East 12th Street Kansas City 26, Missouri

# RARE EARTH METALS

## To Assist You In Solving Metallurgical Problems

### CERIUM STANDARD ALLOY— #1

*Analyzing:*

**50-55% Cerium**
**22-25% Lanthanum**
**15-17% Neodymium**
**8-10%** Praseodymium, Terbium, Yttrium, Illinium, Samarium

**0.5 to 1.5% Max. Iron**

### CERIUM STANDARD ALLOY— #2

*Analyzing:*

**30-38% Cerium**
**32-35% Lanthanum**
**22-25% Neodymium**
**7-9% Praseodymium**
**0.5 to 1.5% Max. Iron**

### MISCHMETAL-MAGNESIUM ALLOYS

**90% Mischmetal — 10% Magnesium**
**80% Mischmetal — 20% Magnesium**
**70% Mischmetal — 30% Magnesium**
**60% Mischmetal — 40% Magnesium**

***Mischmetal and its alloys have produced excellent results in the following applications:***

| | |
|---|---|
| **STAINLESS STEEL:** | Certain grades have shown marked improvement in hot workability. |
| **HIGH TEMPERATURE ALLOYS:** | Improves resistance to oxidation at elevated temperatures. |
| **STEEL CASTINGS:** | Improves castability, ductility and low temperature impact values. |
| **DUCTILE IRON:** | Counteracts effect of subversive elements such as titanium, lead, aluminum, etc. Consistently results in improved physicals. |
| **MAGNESIUM AND ALUMINUM CASTINGS:** | Alloys of magnesium and aluminum show marked improvement in creep resistance at elevated temperature. |

*Write us for further information and literature on any of the above applications or for your specific problems. Your inquiry will receive prompt attention.*

PHILO · TACOMA · BRILLIANT
DEPENDABILITY · QUALITY · SERVICE

### Ohio Ferro Products

- FERRO - SILICON 25 - 50 - 65 - 75 - 85 - 90%
- SPECIAL BLOCKING 50% FERRO - SILICON
- SILICON METAL
- HIGH CARBON FERRO-CHROME
- LOW CARBON FERRO-CHROME SILICON
- FERRO - MANGANESE
- BOROSIL
- SIMANAL
- RARE EARTH ALLOYS

**Briquets**

- SILICON
- MANGANESE
- SILICO-MANGANESE
- CHROME

*Ohio Ferro-Alloys Corporation*
*Canton, Ohio*

Chicago Detroit Pittsburgh Tacoma Seattle
Minneapolis Birmingham San Francisco Los-Angeles

# Furnace linings last longer

## *when they are made of Norton-engineered Special Refractories*

Fewer shut-downs and more continuous operation is always the story when linings are made of Special Refractories engineered to your job by Norton. Whether you are melting ferrous or nonferrous metals there are Norton mixtures for a wide variety of successful applications that mean more metal melted per lining, fewer furnace shut-downs and generally lower costs.

There are so many complications in metal melting, involving chemical, electrical and physical conditions it will pay you to take advantage of Norton's 40 years' experience in solving Special Refractory problems like yours.

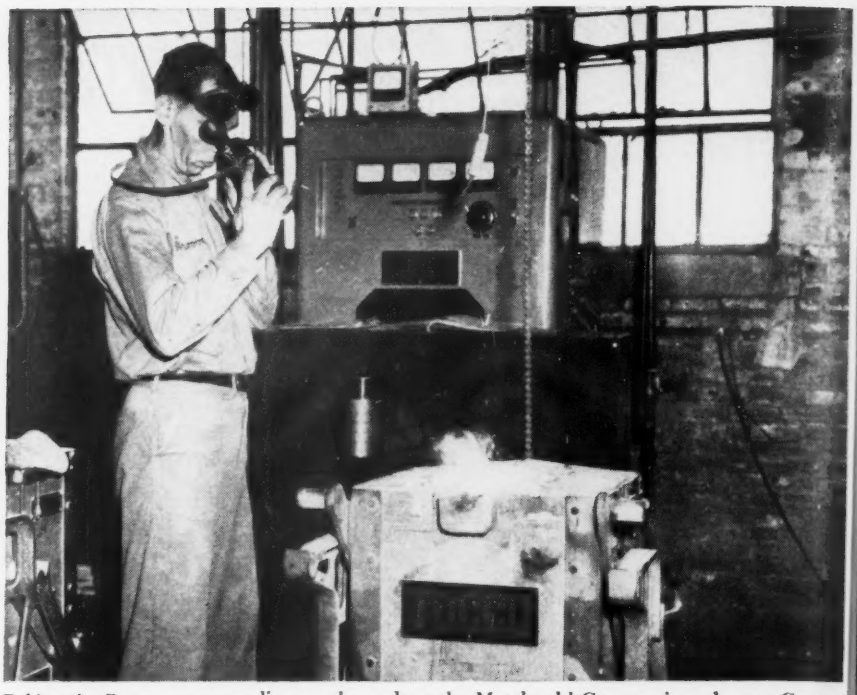
### *Many different materials*

Norton furnishes Special Refractory grain, cements and bonded shapes in a wide variety of mixtures each engineered for a particular set of conditions.

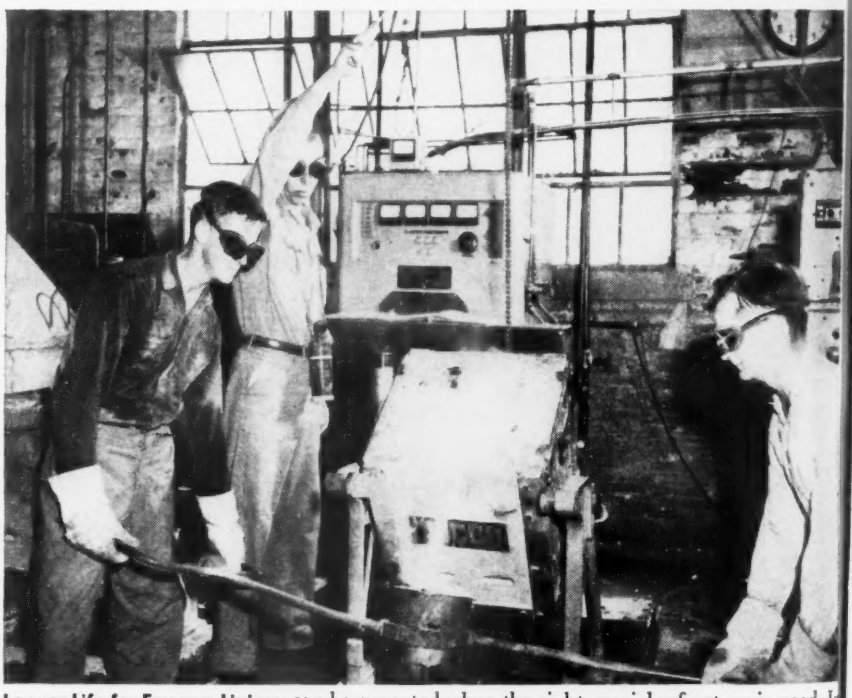
Such special Refractory Materials as CRYSTOLON* (silicon carbide), ALUNDUM*, FUSED STABILIZED ZIRCONIA.

### *What is your problem?*

We believe you will benefit by consulting your nearby NORTON Representative or writing Norton Company, 302 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ontario.



**Taking the Temperature** reading on the melt at the Metalmold Corporation plant at Groton, Mass. Temperatures go 3200° F. and higher. MAGNORITE* grain placed between the crucible and the coil has such high rammed density that it offers great resistance to penetration, erosion and chemical attack.



**Longer Life for Furnace Linings** can be expected when the right special refractory is used. In this plant they count on MAGNORITE to prevent short circuits in the event of crucible breakage. MAGNORITE keeps metal from reaching the primary coil of the furnace.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

NORTON

*Special REFRACTORIES*

*Making better products to make other products better*

**NORTON COMPANY, WORCESTER 6, MASSACHUSETTS**

## *to go to* **BUFFALO** *for our* **PATTERNS"**

Paradoxical as the statement above may seem, smart foundry men everywhere have discovered that it really pays off in "time saved" to come to Buffalo for *better* Patterns. When a Buffalo Pattern is delivered, it will fit your particular set-up and production schedule like a glove. There's *never* any adapting or extra rigging to do on a Buffalo Pattern. And...once you're in production, you'll find that your scrap ratio is so tiny that never again will you use any other kind of Pattern on your important jobs.

Here at Buffalo, you'll find the *new* type of Engineering that plans *every* detail of *every* job and the *old* type of Fine Craftsmanship that takes pride in producing every job *precisely*. If you would like to save money, save time and headaches, we cordially invite you to discover *for yourself* the tremendous difference in a *better* Buffalo Pattern.

**BE OUR GUEST**

Just let us know when you are coming to Buffalo on pattern business. One of our cars will meet you at your plane or train and transport you to our club where you will be our guest during your stay.

Production and Experimental Pattern Equipment • Models, Machined Parts, Jigs and Templates • Shell Mold Pattern Equipment • Permanent Molds for Foundries, Injection Plastics and Reinforced Plastics Pattern Engineering Drawings • Forging Dies • Non-Ferrous Castings • Shell Mold Castings • Metallizing

**BUFFALO PATTERN WORKS, INC.** • **832 HERTEL AVE., BUFFALO 16, N. Y.**

DESIGNERS AND MANUFACTURERS OF PATTERN EQUIPMENT FOR OVER HALF A CENTURY

# UNIVERSAL FLASK PINS

## STAND PLENTY OF PUNISHMENT . . .

## THUS SAVE REPLACEMENT TIME AND COST

**Universal** Flask Pins and Bushings are made to really stand up no matter how much punishment they're given in the foundry. They seldom break or bend—in spite of the beating they take on the shakeout. The bushings show a minimum of wear despite continuous use.

**The reason:** Universal Flask Pins and Bushings are heat-treated and precision ground from high quality steel with the same close tolerances found in machine tool work. Because they stand up, Universal Bushings and Pins save the cost and the down-time that replacement always requires. Because of their precise design and construction, Universal Bushings and Pins allow perfect cope and drag alignment. And because all standard sizes are carried in stock you get prompt delivery. Special sizes and types to order. Complete information is available by requesting the Universal Catalog covering Flask Pins and Bushings. Direct your inquiries and orders to the office nearest you —1060 Broad St., Newark, N. J., and 5035 Sixth Ave., Kenosha, Wisconsin—or write to our home office.

## UNIVERSAL ENGINEERING COMPANY

### FRANKENMUTH 4, MICHIGAN

# The hard, cold facts about Pittsburgh's hot furnaces!

**47 PLANTS OKAY THE HEAT PROVER**

Pittsburgh's great steel industry needed an instrument to measure air infiltration, to check air requirement and fuel-air ratio controls in open-hearth furnaces . . . an instrument to check the stoves in which blast-furnace air is heated . . . to check precise atmospheres in soaking pits . . . to control fuel waste and precise atmospheres in processing furnaces.

THE CITIES SERVICE HEAT PROVER WAS THE ANSWER . . . and it received the stamp of approval from engineers in 47 different mills in and around Pittsburgh!

Cities Service Heat Provers . . . *not an instrument you buy, but a service we supply* . . . helped to boost furnace productivity through these five unique advantages:

**1. Rapid continuous sampling.**

**2. Simultaneous reading of oxygen and combustibles.**

**3. Direct measurement of oxygen and combustibles.**

**4. Easy portability.**

**5. No maintenance; no re-calibration.**

These points begin to tell you why Cities Service Heat Prover analyses are just as much favored in glass, ceramics, steam generation and other fields as in the great Pittsburgh steel area. For the full story as it applies to you, write CITIES SERVICE OIL COMPANY, Dept. D23, Sixty Wall Tower, New York City 5.

**CITIES SERVICE**

# USCO D-2

Looking for lower alloy costs? Select USCO D-2! This is an all-purpose 4% Cu 3% Si aluminum alloy, and like all USCO products, it is produced under our famous Production Control System . . . has been job tested and approved. A few of its advantages are: good castability—excellent machining and finishing properties—less shrinkage. Ask your USCO salesman about D-2 now.

***FREE*** USCO Aluminum Alloy Selector. A handy aid to analysis, specifications and many other foundry problems.

For 48 years, pioneers in aluminum development.

**USCO** **U. S. REDUCTION CO.**
East Chicago, Indiana

*PLANTS: EAST CHICAGO, INDIANA • TOLEDO, OHIO*

**GRAY IRON**

CHARLES O. BURGESS
Technical Director
Gray Iron Founder's Society
Cleveland

**MALLEABLE**

JAMES H. LANSING
Technical and Research Director
Malleable Founders Society
Cleveland

# *Coming in May*

## FOUNDRY's 57th PRE-CONVENTION ISSUE

*Featuring*—a special report on foundry industry progress and the illustrated story of the forthcoming 1953 Foundry Convention to be held in Chicago, May 4 to 8.

**STEEL**

CHARLES W. BRIGGS
Technical and Research Director
Steel Founders' Society of America
Cleveland

**MAGNESIUM**

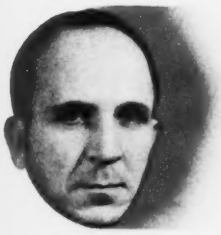
H. E. ELLIOTT
Assistant Foundry Superintendent
Dow Chemical Company
Midland, Mich.

**ALUMINUM**

FLOYD A. LEWIS
Editor
Aluminum Association
New York

## *A Special Report on*

# FOUNDRY INDUSTRY PROGRESS



**MAGNESIUM**

T. E. LEONTIS
Magnesium Laboratory
Dow Chemical Company
Midland, Mich.

*What are the technical and operating advances of the dynamic foundry industry in recent years . . . what is the present-day status of the industry . . . what about its future?*

The editors of FOUNDRY have asked representative industry leaders to discuss these timely questions in a special report. Always an interesting, special issue, this year's Pre-Convention issue of FOUNDRY will, more than ever, aid present and future planning of foundrymen and their suppliers.

**BRASS and BRONZE**

PAUL MAGANUS
President and General Manager
International Castings Corp.
Detroit

**BRASS and BRONZE**

VAUGHAN C. REID
Vice President
City Pattern Foundry & Machine Co.
Detroit

**57th ANNUAL FOUNDRY CONVENTION**
**Chicago, May 4 to 8, 1953**

The May Pre-Convention Issue will be mailed one week earlier than usual to reach readers well in advance of the opening of the Convention.

ADVERTISING FORMS CLOSE MARCH 25, 1953.

**MAY PRE-CONVENTION ISSUE**

**FEATURING . . .**

## *A Special Report on* FOUNDRY INDUSTRY PROGRESS

Industry leaders discuss foundry industry progress: past, present and future.

## A PREVIEW of the 1953 Annual Foundry Convention

Program of Technical Sessions.
Convention Activities.
Committee Personnel.

**JUNE POST-CONVENTION ISSUE**

## REPORTING THE CONVENTION

What was said and done at this year's Foundry Congress.

## All Regular Editorial Features

ADVERTISING FORMS CLOSE MAY 1, 1953

NBP
CCA

**FOUNDRY** A PENTON PUBLICATION • PENTON BUILDING • CLEVELAND 13, OHIO

# Cut Core Costs These 14 Ways

**See how Allis-Chalmers revolutionary system of drying sand cores dielectrically lowers foundry costs and improves your product.**

1. Rapid baking — Takes but a few minutes; provides more production per unit of floor space.
2. Complete baking at lower temperature—means easier handling—less heat in core room—less fuel used.
3. No burning, no overbaking — It's impossible to overbake edges or thin sections.
4. Low core scrap! Cores are hard and dry the minute they come out of the oven. This reduces breakage in handling.
5. Minimum core storage space — Cores can be made up as needed . . . no need to build up stock.
6. Excellent shakeout characteristics.
7. Lower casting rejects — Cores are *completely* cured.
8. Cores usable at once — No cooling required. Core making can be placed right in casting production set-up.
9. Good collapsibility.
10. No oven warm-up — Unit is ready to go at once. Saves fuel.
11. Good dimensional stability in cores.
12. Smoke and fumes minimized.
13. Smoother casting surface.
14. Cost of oven operation is low.

Get complete details on the *Foundromatic* Sand Core Dryer. Call your nearby Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wis.

*Foundromatic* is an Allis-Chalmers trademark.

**ALLIS-CHALMERS**

## QUESTIONS and ANSWERS

### About Dielectric Sand Core Drying

*Do I need an electronic engineer to help me?*

No. Once equipment is installed and operating, any personnel can be quickly trained to follow operating instructions.

*How much maintenance is there?*

Very little. Periodic oiling of conveyor and blower motors and rollers and replacement of tubes.

*Why are resin binders used in place of core oils?*

Core oils require high temperatures and long drying time for complete polymerization. Resin binders cure at lower temperatures . . . approximately 250 F.

*What about collapsibility?*

Resin bonded cores have very good collapsibility, contributing to a faster, cleaner shakeout.

*I want a very hard core, but still want good collapsibility. What do I do?*

Spray the cores with a film of moisture just before putting them on conveyor belt. This will give high surface hardness without affecting collapsibility.

*Can core rods or nails be used?*

Yes. When rods or nails are parallel to electrodes no trouble is encountered. When rods or nails are placed vertically in the core they should be of minimum size in relation to core mass and should not protrude through surface of sand.

*Will light sections burn if dried with heavy sections?*

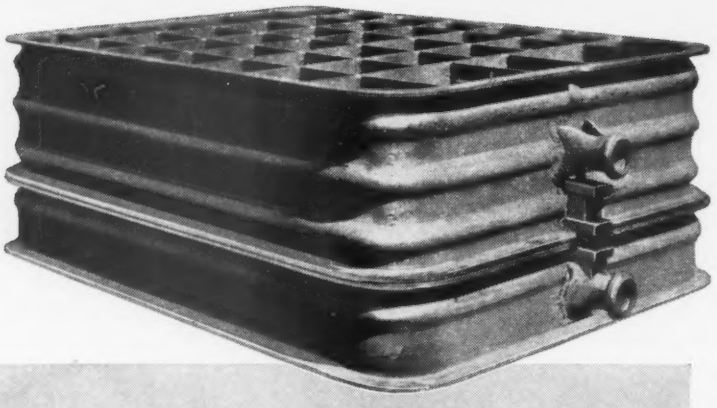
No. Cores will not burn in the *Foundromatic* core dryer.

**SEND**

Allis-Chalmers
Milwaukee 1, Wisconsin

**Please send me new 8-page booklet 15B7306B containing complete information on the *Foundromatic* sand core dryer.**

Name .....
Title .....
Company .....
Street .....
City ..... State A-3850



**Model CH-40**... Extremely large crane handling flask for extra heavy duty. Has intricate barring arrangement. Double bearing welded pin lugs on cope; single bearing welded pin lugs on drag. Extra heavy duty trunnions securely welded.

# OLD FRIENDS... BUT A NEW NAME!

## NOW – SPECIFY

# *Republic* STEEL FOUNDRY FLASKS

● Exactly the same in everything but the name. Here are the steel flasks you've long known and preferred under their former "Truscon" name. In foundries everywhere they've made a reputation for enduring strength and rigidity in the toughest kind of service.

Now, they come to you as "Republic" brand products. Quality is the same in every last detail. Ribs and flanges extend full depth around every Republic Steel Flask. Cope, drag and check are one integral piece of tough steel. Flange on filling side is turned out for easier filling and shaking out. Flange on the bottom side or parting line is turned in, forming a sand strip to carry the sand. Write for illustrated literature describing the complete line of Republic Steel Flasks now available.

**PRESSED STEEL DIVISION**
**REPUBLIC STEEL**
**CORPORATION**

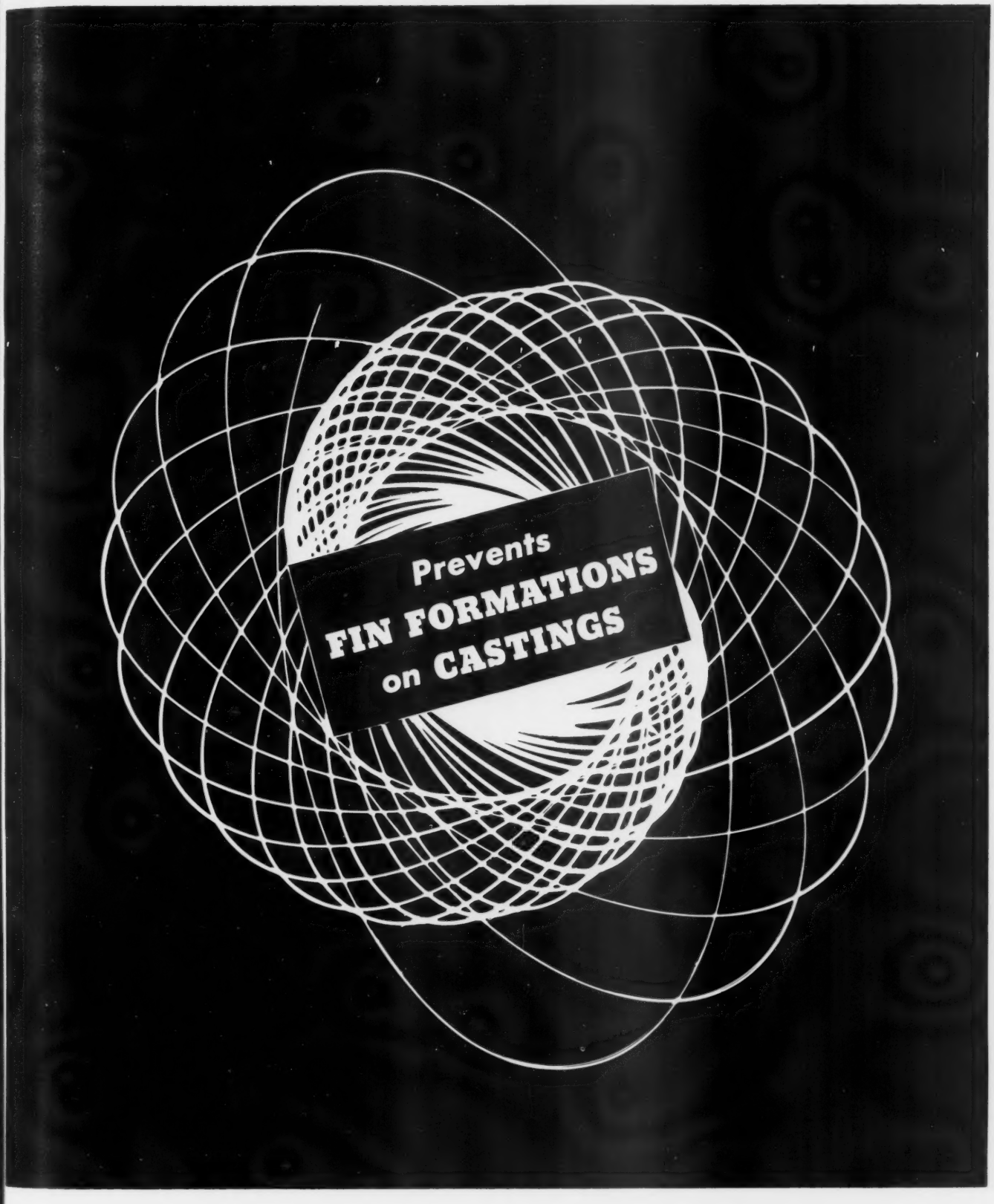
**6208 Truscon Ave., Cleveland 27, Ohio**

**Model OM-4** . . . Especially adapted to fast production machine molding. One man can handle. Equipped with "D" type handles, welded or riveted, and single bearing welded pin lugs.

**Model TM-II**... Medium weight flask for two-man handling. Equipped with single bearing welded pin lugs on cope and double bearing welded pin lugs on drag. Timesavers in handling, ramming and shaking out.

*Republic* STEEL FOUNDRY FLASKS

REPUBLIC STEEL




**THROUGH THE ELIMINATION OF CRACKED CORES,** TAM ZIRCONITE Sand provides a feature of special interest to foundries making cores such as used on pump impellers. Why not get complete facts on the superiorities of ZIRCONITE. Merely, send your request to our New York Office.

*TAM and ZIRCONITE are registered trademarks.

TAM PRODUCTS
Registered U. S. Pat. Off.

**TITANIUM ALLOY MFG. DIVISION**
**NATIONAL LEAD COMPANY**
Executive and Sales Offices: 111 BROADWAY, NEW YORK CITY
General Offices, Works and Research Laboratories: NIAGARA FALLS, N. Y.

" . . . We cut our cleaning
room costs between 50 and 60 percent
as a result of using
Delta GraKoat Wash."

# DELTA GRAKOAT CORE AND MOLD WASH

Delta GraKoat Core and Mold Wash speeds production of finer-finished castings.

Delta GraKoat Wash is moisture proof. When thoroughly dried, it will not absorb moisture. It will not precipitate when properly mixed and will stay in suspension indefinitely. It will not deteriorate. It is highly refractory. Molten metal lays on the surface without the least disturbance. It has high fusion and unusually high hot strength. There is no fusion or sinter below 3300° F. The hot strength is over 600 p.s.i. It does not react with molten metal to form gaseous vapors.

Delta GraKoat Wash anchors itself to the surface by penetrating into the sand. This prevents flaking, peeling, and scabbing when in contact with molten metal. It is easy to apply. It can be dipped, sprayed, swabbed, or brushed on either green or dry sand surfaces. Casting surfaces are free from burn-in and metal penetration and require a minimum amount of cleaning.

Delta GraKoat Wash covers a greater surface area and is much more economical to use. It is recommended for gray iron, malleable and non-ferrous castings.

DELTA

A liberal working sample is available without cost or obligation together with complete instructions for use. Write today.

**DELTA OIL PRODUCTS CO.**

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

Sterling

**225 Sterling Wheelbarrows used daily in this modern production foundry.**

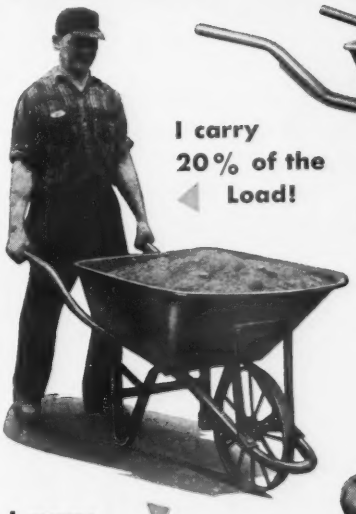
# They Just Keep Rolling Along!

50 years ago, wheelbarrows were used extensively for wheeling sand, castings, scrap, etc. in American foundries. Today . . . even in this highly mechanical age . . . wheelbarrows are just as important as a means of material transport, and just as economical. They require no skilled labor and certainly present no maintenance problem. There is nothing to get out of order. They just keep rolling along.

Sterling All-Steel Wheelbarrows with Tubular Frame are tailor-made for foundries. They are ruggedly constructed to take hard everyday punishment and come back for more. Cost-saving features include: steel tray with lapped corners — all-welded construction, no rivets — heavy steel reinforcing rod rolled around top edge —V front braces and cross supports — All parts securely anchored to the sturdy, one piece steel frame. Be sure to specify STERLING on your next barrow order. IMMEDIATE DELIVERY.

Sterling

**Pneumatic-tired roller bearing wheels assure smooth wheeling and easier handling.**



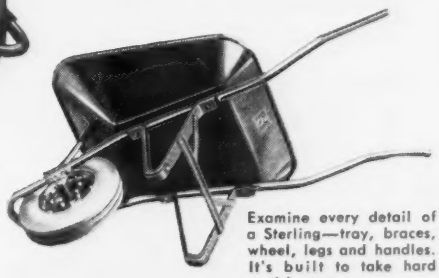
**I carry 20% of the Load!**

**Model DF4-S for Extra Heavy Duty**

A husky steel plate reinforcement supports the front, back and bottom of tray. Prevents breakage and distortion. Adds years to the life of the barrow.

**I carry 80% of the Load!**

Sterling's scientifically balanced construction actually takes 80% of the load off the arms and backs of the barrow men. Crews work faster, make more trips per day.



Examine every detail of a Sterling—tray, braces, wheel, legs and handles. It's built to take hard punishment.

Sterling **WHEELBARROW CO.**

Milwaukee 14, Wisconsin, U.S.A.

BRANCHES: BOSTON • BUFFALO • CHICAGO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • ST. LOUIS

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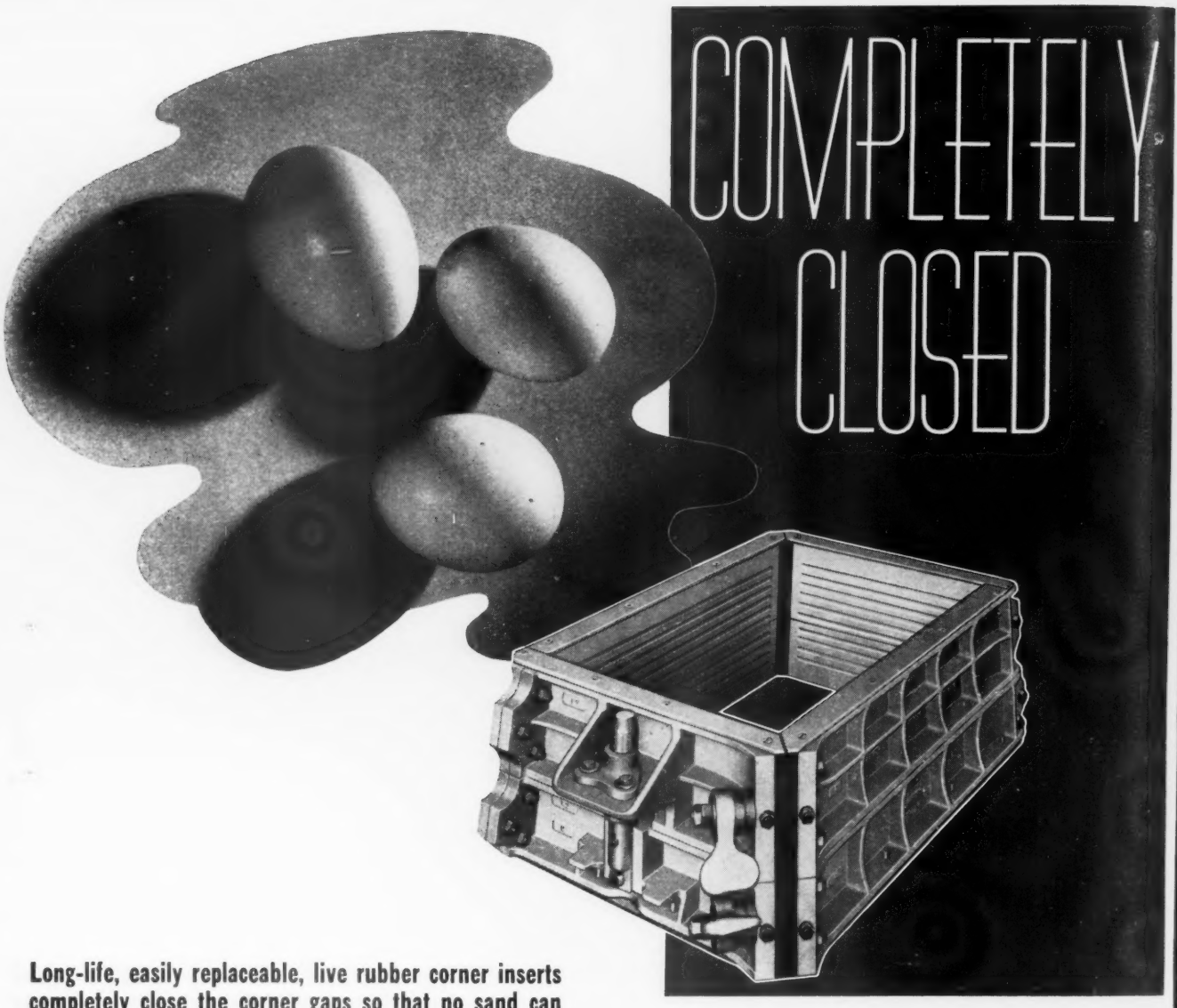



Long-life, easily replaceable, live rubber corner inserts completely close the corner gaps so that no sand can lodge in the open corners of the new

## FREMONT SPREADLOCK FLASK

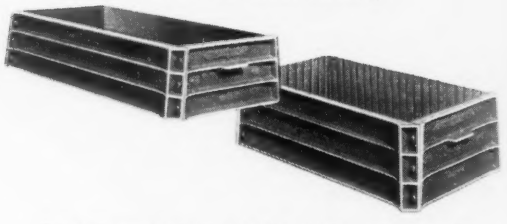
The accurately machined inside surface and flanges, and steel-faced top and bottom flanges assure more exacting work. Magnesium has twice the tensile strength of aluminum — which means longer service — and magnesium weighs ⅓ less than aluminum — which means easier handling.

Write today for free literature and prices on Fremont Spreadlock Flasks, Fremont Standard Slip Flasks (with the GROOV-LOCK FOOLPROOF PIN) and Fremont Cast Iron or Cast Aluminum Jackets (which permit easy insertion of new sides and ends).

All orders given prompt attention.

## FREMONT CAST IRON OR CAST ALUMINUM JACKETS

**Save You Real Money!**

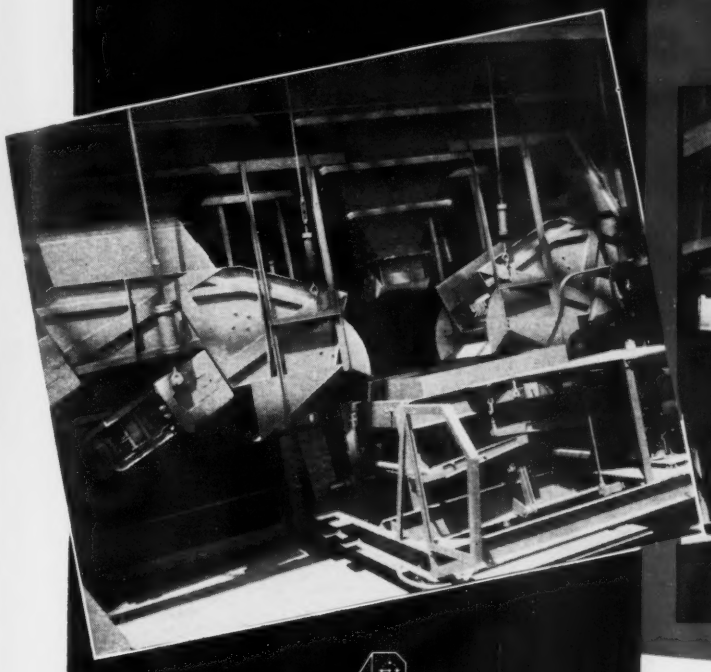


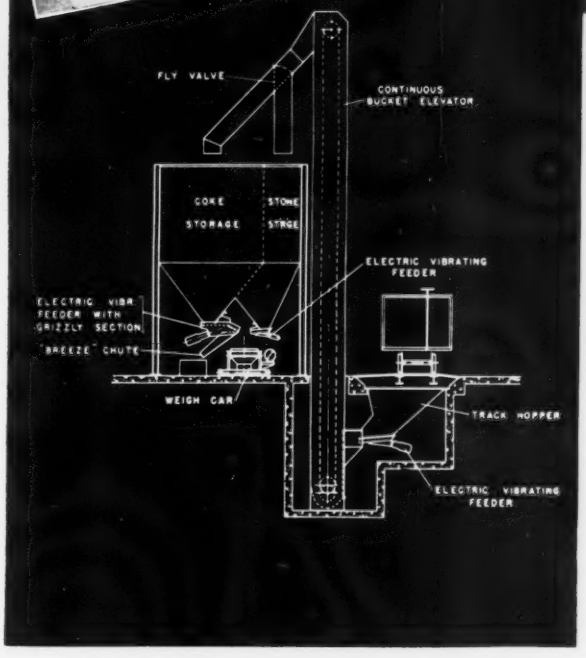
Precision machined and drilled, bolted corner construction permits easy insertion of new sides or ends. The entire jacket need not be scrapped. Standard style for ordinary foundry practice. Grooved style, which permits ready gas escape, for steel foundries. Flasks and jackets can be assembled on 3°, 4°, or 5° taper.

# THE FREMONT FLASK COMPANY

Fremont, Ohio

# COKE AND LIMESTONE UNLOADING and HANDLING






The illustrations above show how Jeffrey Electric Vibrating Feeders are used for controlling feed in coke and limestone handling operations. The pan feeders control feed to bucket elevator and to draw off coke and stone from storage bins. The grizzly feeder eliminates coke "breeze" in charge.

Study the drawing. It shows a typical system with both coke and stone being handled by one continuous-type bucket elevator.

Single units or complete systems are available as well as sound advice and help through experienced foundry engineers. Our Foundry Catalog No. 845 will be sent along on request.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

*sales offices and distributors in principal cities*

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA.

**IF IT'S MINED, PROCESSED OR MOVED**

***. . .IT'S A JOB FOR JEFFREY!***

# *After years of research* **CASTFLUX** *announces the successful development of*

CASTFLUX Trade Mark Reg.

M-D

CASTFLUX Trade Mark Reg.

## SB-10 the 'national' DUAL PURPOSE FLUX

**IN THE LADLE . . . SB-10 increases fluidity materially by cleansing and purifying the metal, bringing to the surface occluded oxides, gases, slag, dirt, etc., offsetting the negative factors of inferior scrap and coke.**

**AS A 'HOT TOPPING' . . . SB-10 prevents oxidation by keeping molten steel down into the main body of the ingot, greatly reducing volume of piping and saving a substantial amount of metal. There is no carbon segregation or pickup.**

**ON BLIND AND OPEN RISERS . . . SB-10 raises the temperature of the metal to a higher degree and substantially increases and maintains the fluidity of the metal during the entire cooling-down period.**

***Selling Agents and Distributors of Castflux:***

St. Louis, Mo.
**M. A. BELL CO.**
with Branches in Houston, Texas and Denver, Colo.

Vancouver, B.C., Canada
**INDUSTRIAL SUPPLIES LTD.**

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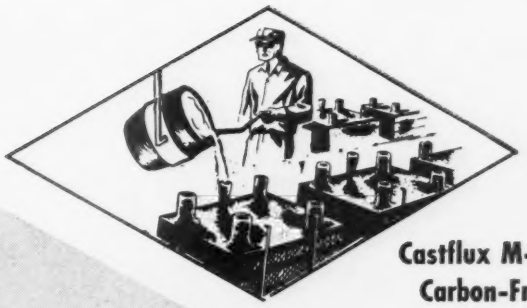
CASTFLUX **NATIONAL pigment c( c.**

Castflux M-10
Carbon-Free
Hot Topping
Compound



Castflux M-10
Carbon-Free
Riser Compound

# a new CARBON-FREE

## HOT TOPPING AND RISER COMPOUND

used on
steel and malleable
castings
and ingots

Years of laboratory research and months of actual field testing have proven the superiority of CASTFLUX M-10 over most hot topping or riser compounds on the market today. The CARBON-FREE contents of M-10 once and for all precludes any carbon pickup, segregation or contamination in any steel or steel alloys, and permits the control of carbon content in your metal without variation.

Depending on the size of the head, various tests have shown as much as 25% reduction in the depth of the piping, resulting in more solid metal in your ingot.

CASTFLUX M-10 will feed more riser metal into the main body of the casting and materially reduce any undesirable shrink, both internal and over-all.

As a ladle covering, CASTFLUX M-10 retains the pouring temperatures of the metal for a far longer period, thus permitting short pouring, and substantial saving of remelt metal.

CARBON-FREE CASTFLUX M-10 with all the improvements and the many advantages is still only priced the same as CASTFLUX SB-10.

That CARBON-FREE CASTFLUX M-10 will increase the yield and improve production at considerable savings has been conclusively proven. You, too, will benefit by a test-trial.

***unconditionally GUARANTEED***

*Unless Castflux meets with your full approval, material can be returned at no expense within 30 days.*

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## USE ELECTROMET'S *PALLETIZED* SILICON BRIQUETS

ELECTROMET has added to its line of ferro-alloy briquets, which aid in the production of high-quality castings, new rectangular-shaped silicon briquets. They are stacked on pallets for convenient and economical handling. These pallet shipments, which are available at no extra charge over bulk shipments, can easily be unloaded and handled in your plant by lift truck or overhead crane. Handling costs are reduced and inventory-taking is simplified. The pallets are expendable and need not be returned.

"EM" palletized silicon briquets are about 6 in. x 3 in. x 2 in. in size, weigh 5 lb. gross, and contain exactly 2 lb. of silicon. The briquets are notched, so that they can easily be split in half when 1 lb. additions of silicon are desired. Because they contain an exact amount of silicon, these briquets offer close control of analysis in cupola melting operations.

Silicon is a deoxidizer, cleanser, and softener of gray iron. Silicon briquets offer a practical, convenient, and economical means of adding this alloy. Ask to have one of our metallurgists call and explain more fully the advantages and use of "EM" silicon briquets.

*The terms "Electromet" and "EM" are registered trade-marks of Union Carbide and Carbon Corporation.*

*Pallets holding approximately 4,000 lb. of "EM" silicon briquets can easily be handled by lift truck.*

*This lifting device is used to handle pallets with an overhead crane. An ordinary sling can also be used.*

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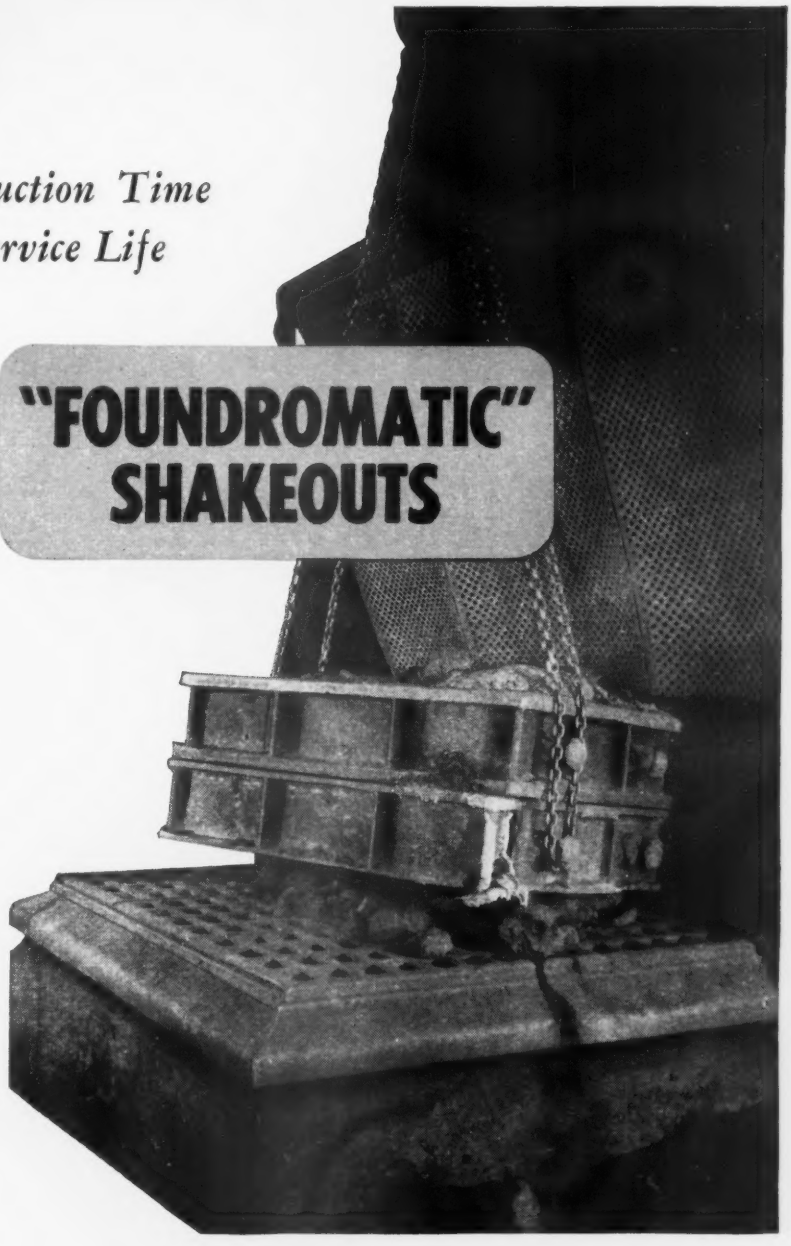
*Get More Shakeout Production Time*
*Plus Added Years of Service Life*



## "FOUNDROMATIC" SHAKEOUTS

**YOU CONVERT** maintenance time to production time when *Foundromatic* shakeouts handle your molds and castings. And the features that cut maintenance costs also add years to service life.

Take the simple two-bearing vibrating mechanism, for example. Since there are no bearings bolted to the foundation, impact loads can't damage either bearings or shaft. No shaft has ever broken from impact on a *Foundromatic* shakeout. Also, a double labyrinth grease seal assures positive protection against dust.

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***Foundry Equipment for Bigger Output—Better Working Conditions!***

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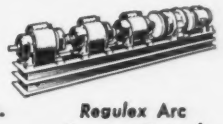
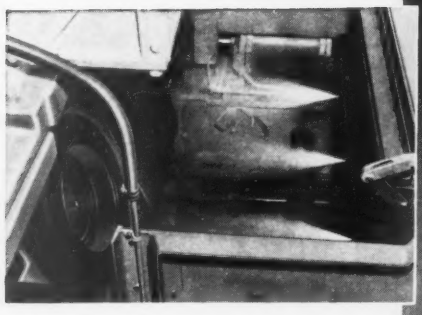
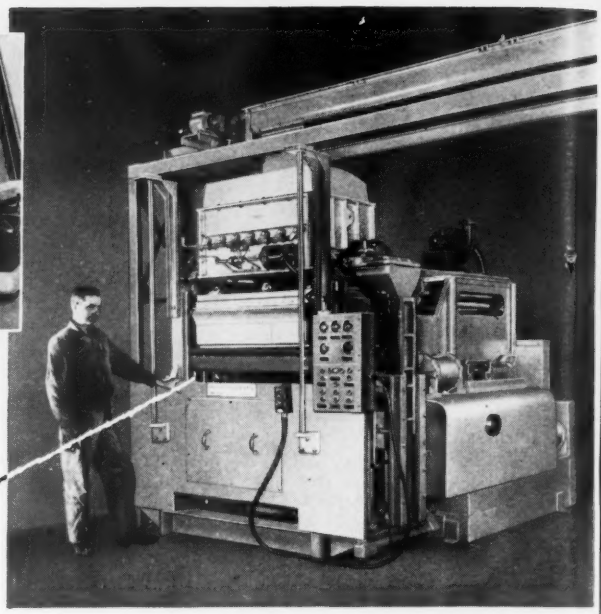

Regulex Arc Furnace Control



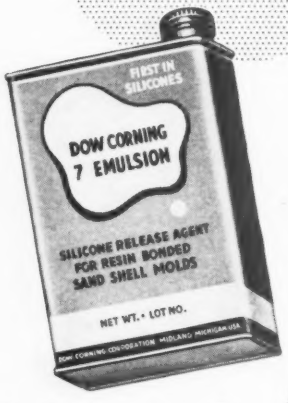


# INCREASE SHELL MOLDING EFFICIENCY

## with DOW CORNING 7 EMULSION

Designed by men with years of experience in industrial shell-molding and built by Shellmold & Machine Co., Inc., of New York City, Model SU-1 is a high-production automatic unit for making shellmolds that produce high-quality castings. With net pattern area of 26" x 41" and 7¼" draw, the SU-1 features the flexibility of time-control of all process steps so essential to uniform production of shells from a wide variety of patterns in automatic-cycle operation. Auxiliary equipment includes an automatic recharge screw-feeder for the sand-resin supply and mechanical shell-removal unit. The silicone parting agent is automatically sprayed on from atomizing jets as the pattern rotates past them (see insert) assuring uniform coverage on every cycle.

***. . . the Silicone Release Agent that gives you Clean, Positive Release of shell molds and cores at lowest cost.***




The more use you make of the shell process, the greater becomes your stake in uninterrupted shell production. That's why experts in this field specify Dow Corning 7 Emulsion as the parting agent. Equally effective as a release agent for hand or power operated equipment, this noncorrosive, nonflammable silicone emulsion assures continuity of operation with even the highest speed automatic machines.

That's because Dow Corning 7 Emulsion gives easy release and will not break down to form a carbonaceous deposit even at top operating temperatures. The most complex patterns stay clean longer and you cut cleaning costs. You also cut production costs by eliminating stickers, and secure uninterrupted production of shells with consistently high dimensional accuracy.

Dow Corning 7 Emulsion is safe, easy and economical to use. It is easily diluted in water to give any desired concentration. Try it yourself at our expense. Send for FREE trial sample TODAY.

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# World's biggest ladle crane trolley rides on TIMKEN® bearings

THIS trolley, built by The Alliance Machine Company, helps the world's largest ladle crane move tons of molten metal quickly and easily, with the utmost safety.

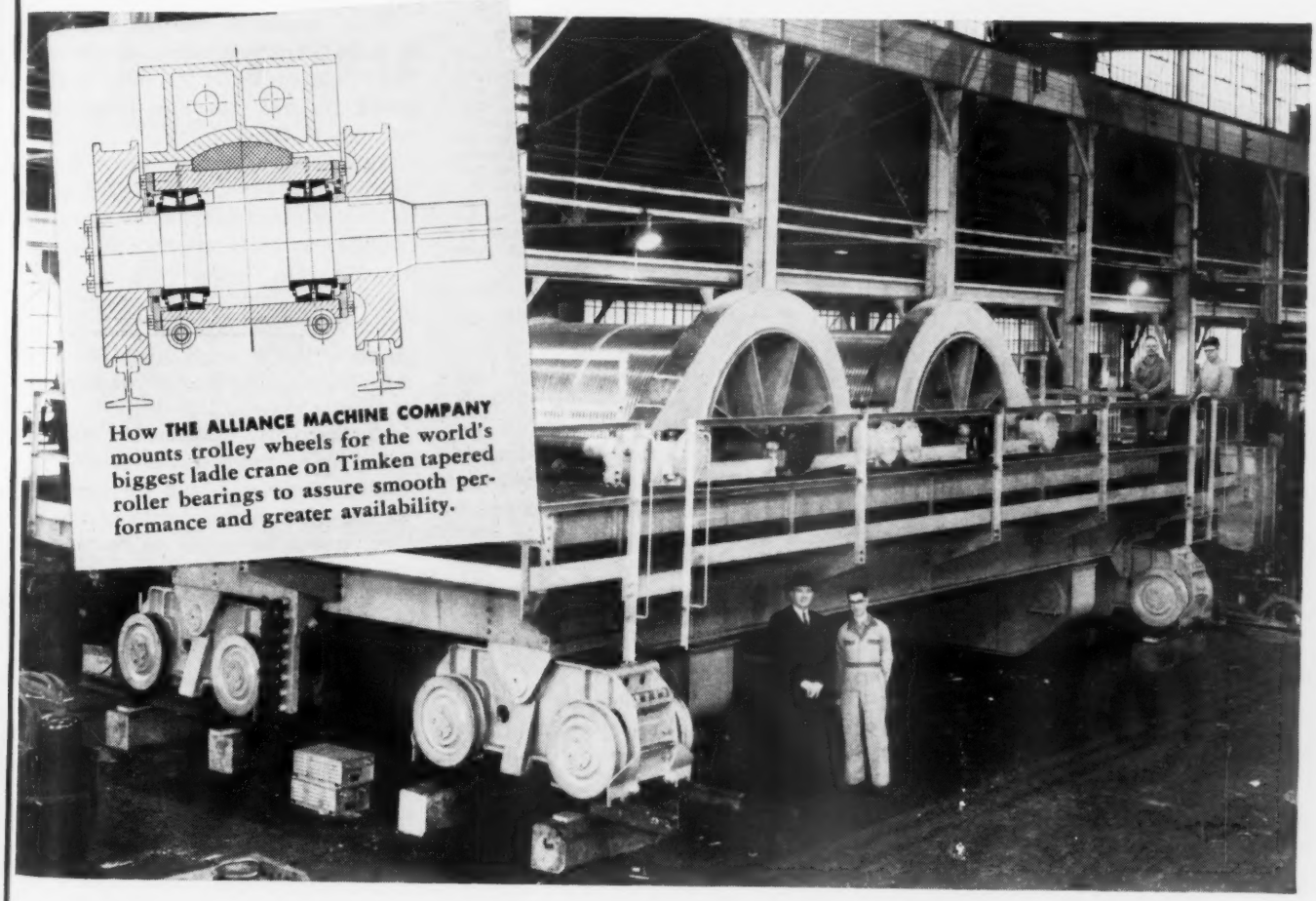
To insure smooth performance and greater availability, Alliance engineers have mounted each of the trolley's double-flange track wheels on Timken® tapered roller bearings.

The tapered construction of Timken bearings enables them to take radial and thrust loads in any combination. Timken bearings provide high capacity in a small space because of line contact between rollers and races. As a result, they carry the heavy loads on the trolley's wheels with capacity to spare. The wheels start quickly, turn smoothly, with minimum friction because of the true rolling motion and incredibly smooth surface finish of Timken bearings.

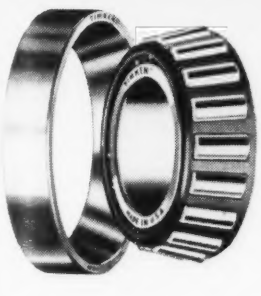
Timken bearings hold housings and shafts concentric. As a result, closures are more effective — dirt stays out, lubricant stays in. Maintenance and lubrication costs are held to a minimum.

No other bearing can give you all the advantages you get with Timken tapered roller bearings. Specify them for the machinery you build or buy. Always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

*This symbol on a product means its bearings are the best.*



How **THE ALLIANCE MACHINE COMPANY** mounts trolley wheels for the world's biggest ladle crane on Timken tapered roller bearings to assure smooth performance and greater availability.



**TIMKEN**

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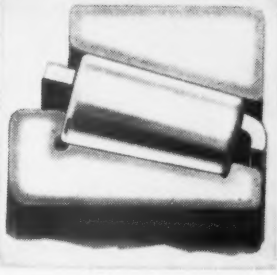
**TAPERED ROLLER BEARINGS**



**HARD ON THE OUTSIDE, TOUGH ON THE INSIDE**

Rollers and races of Timken bearings are case-carburized to give a hard, wear-resisting surface and a tough, shock-resisting core. Result: longer bearing life.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

# Readers' COMMENT

## Wants Tearsheets

TO THE EDITORS:

Our foundry section is interested in the following articles from the January, 1953, issue of FOUNDRY: "New Precision Investment Foundry," "Casting Design for Heavily Loaded Parts," and "Effect of Raw Materials on Cupola Operation." If tearsheets or reprints of these are available, we would appreciate it very much if we might have a copy of each.

LOTTA C. STRONG

Manufacturing Research Department
*International Harvester Co.*
*Chicago 9, Ill.*

* * *

## Why Not Stockpile Castings?

**The Advisory Committee of Production Equipment, headed by Harold S. Vance, recently presented a report which urges the creation and maintenance of a large capacity to produce military end items which can be expanded quickly in event of war. Believing the objectives of the plan desirable, but the method unsound and uneconomical, Charles E. Moore, president, Moore Machinery Co., San Francisco, has presented a plan to the Secretary of Defense and the press which should be of interest to the foundry industry. A part of Mr. Moore's comment is as follows:**

To build a machine tool you start with a casting. About the biggest bottleneck we suffer in times of national emergency is the productive capacity of our iron and steel foundries—i.e., castings.

The foundry business is notorious for its production peaks and valleys. It calls for highly skilled labor which cannot be taught overnight.

In my operation of Joshua Hendy Iron Works on the Pacific Coast during World War II, we were purchasing castings from 17 different foundries as far east as New York. Obviously, we were competing with the builders of machine tools at a time when they were also in desperate need of castings.

Nothing improves in quality like a rough machined casting that is allowed to lie out in the open, exposed to the elements. This "seasoning" relieves internal strains and prevents future distortion. On the other hand, a finished machine tool will deteriorate rapidly unless it is carefully and expensively stored.

My plan is as follows:

For those machine tool builders who need financing, a government guaranteed loan at a very low rate of interest would be available to enable them to purchase a considerable supply of castings. The builders would be permitted to depreciate the cost of these castings over a period of not less than three nor more than five years. The government would recover from taxes on profits resulting from the ultimate sale of finished machine tools. Undoubtedly the tax rate would be high during a period of emergency when these tools would be sold.

These rough castings would then be rough machined and stored out in the open. Rough machining would disclose any existing defects. Defective castings would be repaired or replaced so that all castings in storage would be known to be sound.

These are the advantages:

With seasoned, proved castings available for immediate use, machine tool builders could produce latest-model finished machine tools in a very short time.

Automobile manufacturers, whose product is the first to be discontinued in time of emergency, could use their facilities to build machine tool components.

Builders could incorporate their latest and most efficient designs to go on to those rough machined castings. Thus the danger of obsolescence is greatly reduced.

Furthermore, finished machine tools made from these rough machined castings would be furnished to the exact requirements of the job they would be called on to perform in the national emergency.

Cost of storage and insurance of these rough machined castings would be almost nil.

They could be and should be stored in open fields exposed to the elements, insuring that the machine tools from which they are made will be a highly superior product.

And by having rough machined castings made now, the job is done when coremakers, molders and other highly skilled men are available.

My plan is that instead of stockpiling machine tools we simply stockpile rough machined castings. This would give the nation the means to produce machine tools quickly in the event of an emergency without prohibitive cost.

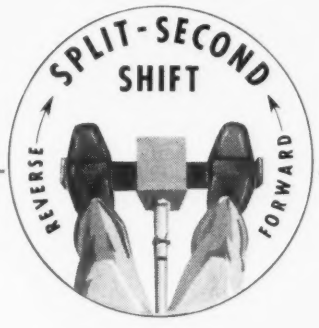
CHARLES E. MOORE
President

Moore Machinery Co.
700 Minnesota St.
San Francisco 7

# LOOK no hands!

## *Split Second* FOOT CONTROL

### for FORWARD and REVERSE




Unique foot pedal control provides split-second change from forward to reverse. No clutching; no gears to shift. Operator's hands are free for scoop operation and steering. The time thus saved per trip adds up to many additional trips per day.

## Bucket Loaders By 'Butler'

**"the machines that serve you best"**

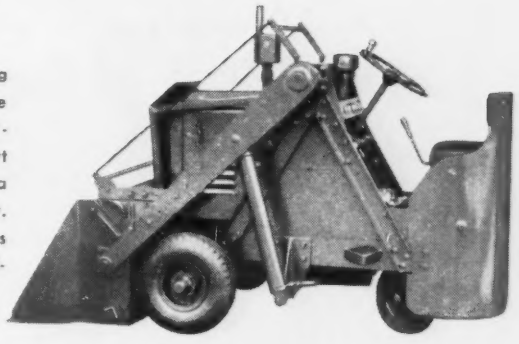
## CARSCOOP DIVISION BUTLER BIN CO.

940 Blackstone Ave. • Waukesha, Wis.

A high speed machine . . . travels up to 11 m.p.h., a great advantage in long distance transport. Use the 102 'Butler' to unload box cars of bulk materials. For factory yard work, too. (Ask for bulletin 250B)

MODEL 102

Where maneuvering space is "tight", the GA-9 Butler CARSCOOP with its short turning radius is a most versatile unit. Further, its low cost is inviting. (Ask for bulletin 250D)

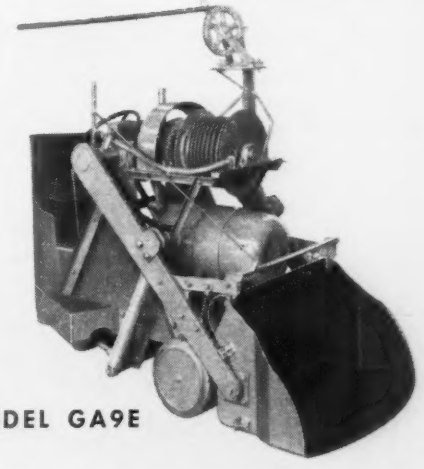


MODEL GA9

A most versatile unit. Handles just about everything. An exclusive feature of bucket tip-back control aids in picking up full loads of free flowing material, such as grain or salt. (Send for bulletin 250C)

MODEL 203

In operations where noxious engine fumes are a health hazard, this agile electric motor operated Butler CARSCOOP is a practical answer. Operates on 220 or 440 volt current. (Specification bulletin 250E)



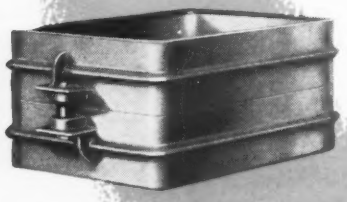
MODEL GA9E

# Yes Sir! STERLING Builds Flasks in ANY SIZE...ANY HEIGHT... ANY WIDTH!

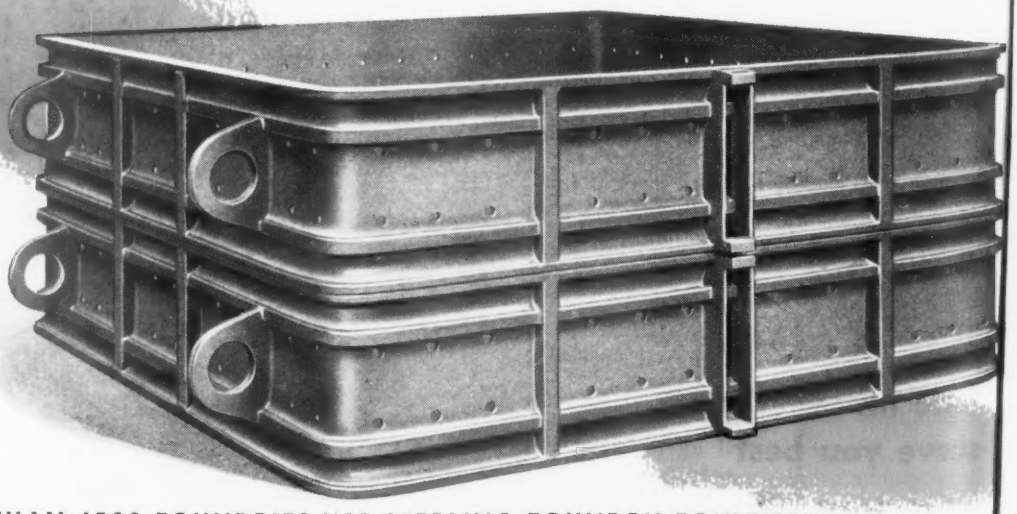
## Ruggedly Constructed to Fit Your Needs ... Limited Only by Shipping Restrictions

You can get any foundry flask you need from Sterling . . . no matter how "special" your requirements may be . . . flasks for hand or machine molding . . . for green sand or dry sand . . . for jobbing or production work. Sizes range from the small bench type flask to the very largest size accepted by the transportation companies. Sterling Steel Flasks are built to rigid specifications according to modern engineering design. If you have ANY flask problem . . . Consult Sterling. Ask for Sterling Catalog No. 64A.

**STERLING WHEELBARROW CO., Milwaukee 14, Wis., U.S.A.**



**Sterling Style "E"**
Flask for small and medium sized work. Available with interchangeable copes and drags, combination pin lugs and handles.



**Style 3/8 ND-RT**
Special (72" x 72" x 15"C x 15"D). This is a heavy duty rolled steel flask with special heavy reinforcing bars on both cope and drag. Lifting loops for convenient handling.

A-7467-1PC

**MORE THAN 4500 FOUNDRIES USE STERLING FOUNDRY EQUIPMENT**

# Still Room for Improvement

With price controls abolished and the Controlled Materials Plan moving into the milder Defense Materials System, foundrymen should profit in comparing recent experiences in government controls with those of the previous emergency period.

There can be no doubt that all segments of the foundry industry fared much better under the most recent period of controls than was achieved during the critical periods of World War II.

Improvement in the position of the foundry industry was demonstrated by widespread recognition of the basic character of castings for both military and civilian production; by somewhat more satisfactory setups in the mobilization agencies; by the high-grade personnel charged with handling the problems of castings; and with the high standing of the various foundry industry advisory committees.

Understanding of the importance of castings resulted mainly from the exceptional educational work of the various trade associations serving foundries. The effort covered all departments of government in any way connected with procurement of castings. Some small credit may be given to the work of foundry industry advisory committees to the Munitions Board in the period between World War II and Korea.

While some progress can be reported in the agencies for handling foundry mobilization problems, this proved to be the weakest point in the relationship between foundries and government. The best deal was secured by the nonferrous foundry industry, where a foundry branch handled problems of copper-base alloy casting producers. In other foundry fields, castings were handled as sections under the basic metals divisions. The ferrous foundry industries made a valiant effort to correct this unsatisfactory situation by raising the Ferrous Castings Section of the Iron and Steel Division to branch status. While top brass in the mobilization program recognized the justice of the proposal, vindictiveness on the part of some executives in the Iron and Steel Division scuttled the plan.

High praise should be given to the men who left industry to serve in the various castings agencies, and to the many foundrymen who worked on the toughest problems as members of foundry industry advisory committees. Both industry and government owe those men a deep debt of gratitude. Yes, progress has been made, a good job was done.

However, possibility for improvement in the relationship between government and industry during high production emergencies seems great. In this troubled world, with mounting international incidents and tensions, foundrymen should set the stage to permit even greater service to the nation if war grows hotter.

And now appears to be the time to provide plans and programs.

Frank G. Steinebach
Editor

# CALCIUM CARBIDE INJECTION

## • • • Is New Tool in Gray Iron Metallurgy

*The authors describe how calcium carbide injection into molten iron can be employed for these varying purposes: Desulphurizing to conventional ranges; desulphurizing to extremely low levels which provide minimum chilling tendency and permit use of more economical alloy additions; desulphurizing as a base for spheroidal graphite cast iron; to upgrade and spheroidize iron of low tensile strength*

By HARVEY E. HENDERSON
*Research and Development Metallurgist*
Lynchburg Foundry Co.
Lynchburg, Va.

and PHILIP M. HULME
*Section Head—Metallurgical Process Division*
Air Reduction Co. Inc.
New York

FOR many years, attempts were made to use calcium carbide as a treating agent for molten metals. Except where used as an active ingredient in the finishing slags for certain tool steels produced in the arc furnace, little success attended these efforts.

The melting point of carbide is far above the range of the highest steelmaking temperatures. Therefore, in order to obtain any reaction between solid carbide and liquid metal, the carbide must be finely divided and each particle must be brought into intimate contact with the metal. Because carbide is very light compared to liquid ferrous metals, the mechanical problem has been difficult to solve.

An experiment conducted jointly by the Air Reduction Co. and the U. S. Bureau of Mines during the late thirties demonstrated that carbide reacts with excellent efficiency when fine particles are dispersed into molten iron by means of a refractory centrifuge. Removal of sulphur from iron is a good measure of the reactive power of carbide. The following table shows some of the desulphurizing results obtained at the Bureau of Mines when carbide was injected into iron by the refractory centrifuge method.

| Test No. | % of Sulphur Start | Finish | % S Removed | Lb Ca $C_2$ per Lb S Removed |
|---|---|---|---|---|
| 126 | 0.097 | 0.007 | 92.7 | 5.56 |
| 127 | 0.083 | 0.012 | 85.6 | 6.75 |
| 132 | 0.096 | 0.019 | 80.2 | 6.50 |

C. E. Wood, E. P. Barrett, and W. F. Holbrook, "Desulphurization of Pig Iron with Calcium Carbide," Trans. AIME (1940) 140, p. 87.

The centrifuge head was good for only one test. It was also quite expensive. Thus, it proved impractical for operations on a plant-wide scale, and other means were sought to disperse the carbide into the metal. The most promising method seemed to

**TABLE I—Improvement in Physical Properties of Some Acid Cupola Production Irons by Injection of Calcium Carbide**

| Lab. No. | Si | S | P | Mn | TC | Mo | Cr | Cu | Trans | Def | Tensile | Bhn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12195 Untreated | 2.69 | .058 | .035 | 1.01 | 3.03 | .70 | — | 1.32 | 3686 | .360 | 54,850 | 28 |
| 12215 Treated | 2.41 | .047 | .035 | 1.00 | 3.01 | .72 | — | 0.94 | 3843 | .328 | 61,210 | 25 |
| 12213-14 Untreated | 1.88 | .081 | .062 | 1.00 | 3.49 | — | 0.30* | — | 1916(f) | .212 | 33,030 | 21 |
| 12213-6 Treated | 1.89 | .041 | .062 | .70 | 3.46 | — | 0.72 | — | 2335(f) | .284 | 35,150 | 20 |
| 12355 Treated | 1.67 | .040 | .095 | .87 | 3.37 | — | 0.38 | — | 2856 | .324 | 42,130 | 21 |
| 15514 Treated | 1.48 | .038 | .073 | .76 | 3.46 | — | 0.37 | — | 2944 | .328 | 45,620 | 22 |
| 15525 Untreated | 1.54 | .052 | .092 | 1.11 | 3.67 | 0.30* | 0.25* | 0.30* | 2318 | .248 | 34,250 | 20 |
| 15527 Treated | 1.78 | .032 | .106 | 1.17 | 3.56 | 0.30* | 0.25* | 0.30* | 2620 | .272 | 44,120 | 18 |
| 15738 Untreated | 1.65 | .078 | .110 | .65 | 3.54 | 0.27 | 0.24 | 0.33 | 2655 | .328 | 36,160 | 20 |
| 15724 Treated | 1.71 | .041 | .104 | .67 | 3.55 | 0.25 | 0.23 | 0.29 | 2829 | .320 | 43,800 | 22 |

* Estimated. (f) Flawed bar.

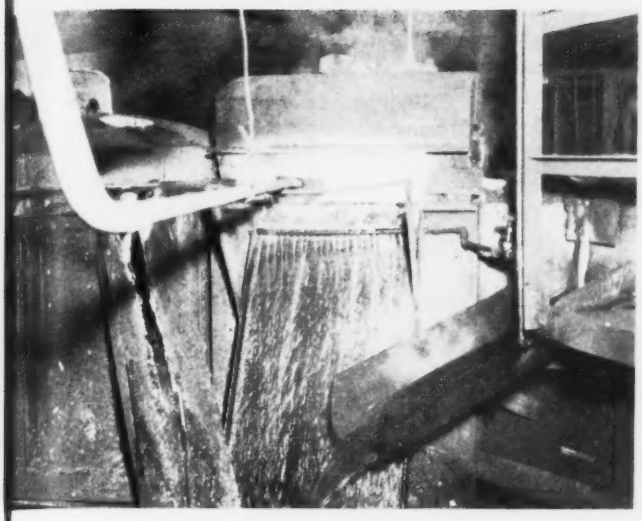


Fig. 1—Injecting carbide into cupola forehearth. Dry slag formed is removed by rabble in foreground

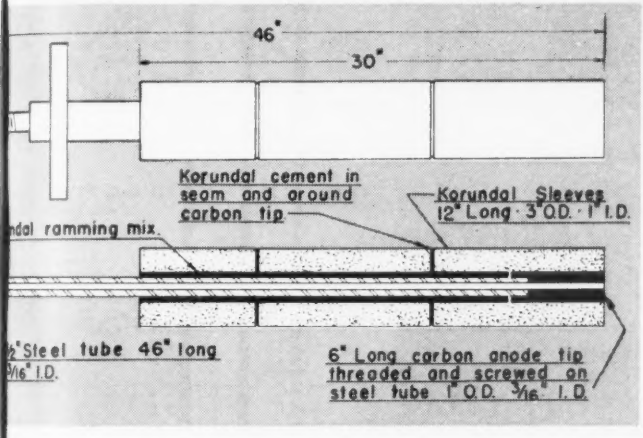

46"
30"
Korundal cement in seam and around carbon tip
Korundal Sleeves 12" Long · 3" O.D. · 1" I.D.
ndal ramming mix
½" Steel tube 46" long
6" Long carbon anode tip threaded and screwed on steel tube 1" O.D. 3/16" I.D.

Fig. 3—This tube for injecting the carbide will last several hours at cupola-tapping temperatures

be that of blowing the carbide into the molten bath in a stream of gas. Nitrogen gas is usually employed as the carrier of the carbide particles. Carbon dioxide and argon have given equally good results metallurgically. Neither air nor oxygen is satisfactory.

Other devices are under development to aid in the adaption of the process for plant-scale operations.

Fig. 2—Injection equipment for feeding the flux. Its capacity is 3 to 4 lb of carbide per minute

One of these, shown in Fig. 2, is a magnetically-operated vibratory feeder which, while not as flexible over as wide a range of solid-gas ratios as a screw feeder, is more adaptable to plant-scale work. Several other feeders are being developed and tested which contain no moving parts and which are capable of transporting the carbide-gas mixture uphill and around corners. Such considerations are important in obtaining a feeder design that will be rugged and easily installed in commercial plants.

The tubes which are thrust into the molten metal to convey the carbide-gas mixture have been developed along two main lines. First, where long tube life is unimportant, carbon or graphite tubes are used.

**TABLE II—Physical Properties of Some Production Ductile Irons Made by Desulphurizing Acid Cupola Melted Base Iron with Calcium Carbide**

| Ladle No. | Nodularizing Alloy Added | FeSi Added | CHEMISTRY Si | S | P | Mn | TC | Ni | PHYSICALS Tensile | Yield Point | Bhn | % Elong | % R A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 645Z | No. 2 Alloy—2% Mischmetal—0.04% | 1.5% | 2.78 | 0.026 | 0.062 | 0.35 | 3.56 | 0.64 | 91,275 | 67,500 | 241 | 5.5 | 5.1 |
| 646Z | " | " | 2.53 | 0.014 | — | — | 3.53 | — | 77,275 | 67,750 | 192 | 3.5 | 3.1 |
| 647Z | " | " | 2.78 | 0.018 | 0.059 | 0.34 | 3.54 | 0.64 | 72,750 | 54,450 | 196 | 6.0 | 5.1 |
| 649Z | No. 1 Alloy—1.0% No. 2 Alloy—1.5% Mischmetal—0.04% | " | 2.41 | 0.022 | 0.041 | 0.34 | 3.41 | 0.73 | 99,475 | 86,475 | 241 | 4.0 | 3.9 |
| 652Z | " | " | 2.46 | 0.022 | 0.070 | 0.32 | 3.41 | 1.01 | 110,625 | 92,750 | 255 | 3.5 | 3.5 |
| 654Z | No. 2 Alloy—2% Mischmetal—0.04% | " | 2.46 | 0.022 | 0.078 | 0.32 | 3.50 | 0.60 | 89,100 | 73,075 | 217 | 7.0 | 5.9 |
| 656Z | " | " | 2.73 | 0.024 | 0.056 | 0.32 | 3.52 | 0.64 | 86,600 | 75,800 | 207 | 7.5 | 7.8 |
| 659Z | " | " | 1.68 | 0.030 | 0.059 | 0.33 | 3.54 | 0.62 | 79,250 | 59,525 | 202 | 10.0 | 5.8 |
| 660Z | " | " | 1.59 | 0.020 | 0.081 | 0.32 | 3.54 | — | 75,700 | 61,125 | 196 | 4.5 | 1.9 |
| 662Z | " | " | 2.78 | 0.022 | 0.084 | 0.31 | 3.48 | 0.62 | 76,100 | 51,475 | 207 | 6.0 | 4.4 |
| 664Z | " | " | 2.88 | 0.018 | 0.068 | 0.30 | 3.47 | 0.73 | 81,650 | 61,975 | 192 | 10.0 | 7.0 |
| 667Z | " | " | 2.84 | 0.026 | 0.046 | 0.34 | 3.48 | 0.56 | 72,400 | 59,650 | 207 | 6.5 | 3.9 |
| 669Z | " | " | 2.94 | 0.024 | — | — | 3.47 | — | 75,275 | 60,000 | 202 | 8.0 | 5.1 |
| 671Z | " | " | 3.13 | 0.014 | 0.059 | 0.32 | 3.40 | 0.75 | 81,100 | 63,625 | 196 | 9.0 | 6.2 |

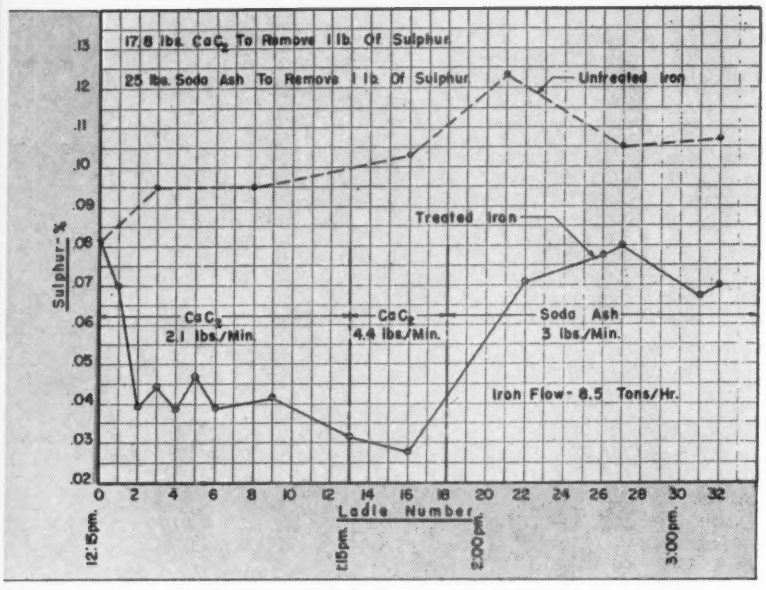



Fig. 4—Results of desulphurization when using calcium carbide and fused soda ash

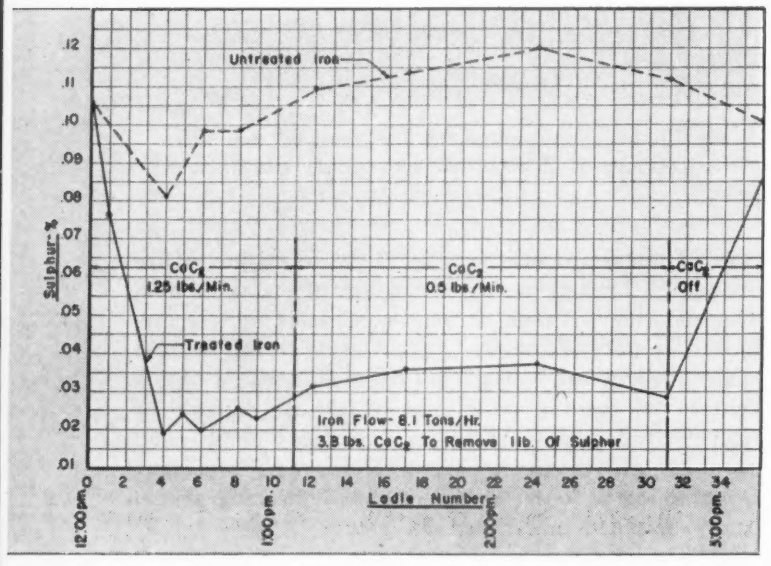
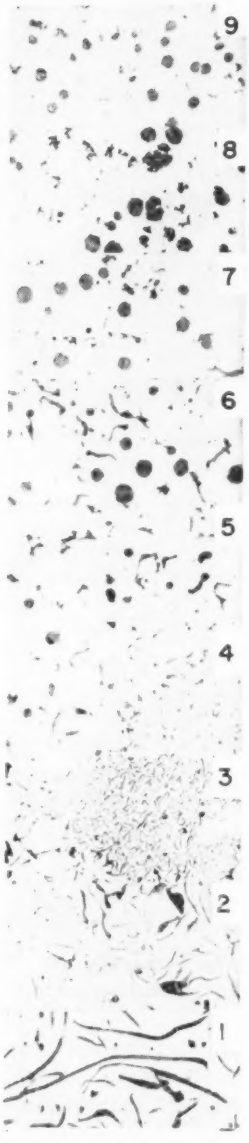



Fig. 5—Desulphurization with calcium carbide




| Tensile Strength | Bhn | % El | Treatment Applied to Iron To Get Structure Physicals shown |
|---|---|---|---|
| 92,600 | 217 | 6.0 | (1) $CaC_2$ 15 lb/T-REO FeSi 60 lb/T Late (2) $CaC_2$ 15 lb/T-REO FeSi 30 lb/T Late FeSi 30 lb/T add melt in |
| 79,500 | 165 | 9.3 | (1) $CaC_2$ 15 lb/T-MgO T-FeSi 40 lb/T Late (2) $CaC_2$ 30 lb/T-MgO T-NiMg 10 lb/T- lb/T Late (Both cast white a nealed) |
| 73,900 | 179 | 11.0 | (1) $CaC_2$ 30 lb/T-NiMg T-FeSi 20 lb/T Late (2) $CaC_2$ 15 lb/T-REO FeSi 20 lb/T Late (3) NiMg 28 lb/T-FeSi T Late |
| 65,000 | 179 | 3.5 | (1) $CaC_2$ 15 lb/T-MgO T-FeSi 40 lb/T Late (2) $CaC_2$ 15 lb/T-MgO T-REO 1 lb/T-FeSi T Late |
| 56,900 | 159 | 3.5 | (1) $CaC_2$ 15 lb/T-MgO T-FeSi 40 lb/T Late (2) $CaC_2$ 30 lb/T-MgO T-FeSi 30 lb/T Late (3) $CaC_2$ 15 lb/T-FeSi T Late (Lower silicon ba Si=1.60%) |
| 43,300 | 156 | 0 | (1) $CaC_2$ 15 lb/T-MgO T-FeSi 20 lb/T Late |
| 30,100 | 128 | 0 | (1) $CaC_2$ 30 lb/T-FeSi T Late |
| 15,300 | 95 | 0 | (1) FeSi 20 lb/T Late |
| 14,400 | 87 | 0 | (1) FeSi 10 lb/T Late |

Fig. 6—Properties obtained by varying post melt treatment of same analysis hypereutectic iron. TC 4.00; Si 2.00; Mn 0.20; S 0.020; P 0.045. All of the structures illustrated are "as cast" unless otherwise noted

Fig. 7—Carbide bath in the trough at Lynchburg's plant Bath is 17 x 22 in., 18 in deep, holds 1500 lb of iron

Second, where tube life is a more critical factor, refractory-covered tubes have been designed to operate continuously for some hours in a flowing stream of molten metal. The first type is easily obtainable since any good carbon or graphite tube will serve the purpose. To get a satisfactory tube of the second type, however, has been extremely difficult. The best so far devised is shown in Fig. 3. This tube is covered with Korundal, and is reasonably cheap. When put together correctly and attached to a feeder which gives a steady, uniform solid-gas feed, the tube will last for several hours immersed in a stream of molten iron at cupola tapping temperatures. Other materials and designs are under investigation with the hope of bettering this performance. However, for the present, the Korundal tube gives sufficient life for all practical purposes.

First testing of the process on a plant scale was at the American Tube & Stamping Division of the Stanley Works, Bridgeport, Conn., where facilities were available to the Air Reduction Co. Midway through the pilot plant work at Bridgeport, the Lynchburg Foundry Co., Lynchburg, Va., became interested in the development of the new process. Most of the test data reported from this point on represent the result of close association between the technical staffs of the Air Reduction Co. and the Lynchburg Foundry Co. Correlation of results obtained

**TABLE III—Showing Effect of Crucible Lining and MgO Additions in $CaC_2$ Treatment**

| Heat No. | Crucible Lining | Treatment in Lb per Ton of Metal $CaC_2$ | MgO | FeSi | Tensile Strength psi | Brinell Hardness |
|---|---|---|---|---|---|---|
| 279-1 | Acid | — | — | 28 | 14,750 | 122 |
| 279-3 | " | 100 | — | 28 | 17,750 | 107 |
| 283-1 | " | — | — | 28 | 14,630 | 79 |
| 283-5 | " | 100 | 5 | 28 | 31,125 | 149 |
| 286-1 | " | — | — | 28 | 10,500 | 89 |
| 286-10 | " | 95 | 5 | 28 | 34,250 | 131 |
| 271-1 | Basic | — | — | 25 | 14,300 | 100 |
| 271-2 | " | 62 | — | 25 | 52,125 | 176 |
| 272-1 | " | — | — | 28 | 13,350 | 78 |
| 272-3 | " | 105 | — | 28 | 63,700 | 195 |

**Chemical Analysis Before and After Treatment—Per Cent**

| Heat No. | Total Carbon Before | Total Carbon After | Silicon Before | Silicon After | Manganese Before | Manganese After | Sulphur Before | Sulphur After | Phosphorus Before | Phosphorus After |
|---|---|---|---|---|---|---|---|---|---|---|
| 279 | 3.75 | 3.83 | 2.42 | 2.89 | 0.56 | 0.61 | 0.031 | 0.015 | 0.018 | 0.021 |
| 283 | 3.84 | 3.83 | 2.95 | 3.23 | 0.54 | 0.55 | 0.045 | 0.013 | 0.018 | 0.011 |
| 286 | 3.73 | 3.92 | 2.74 | 2.59 | 0.42 | 0.40 | 0.019 | 0.013 | 0.017 | 0.013 |
| 271 | 3.85 | 3.89 | 2.49 | 2.86 | 0.77 | 0.75 | 0.031 | 0.013 | 0.019 | 0.035 |
| 272 | 3.86 | 3.89 | 2.80 | 2.91 | 0.59 | 0.62 | 0.025 | 0.013 | 0.018 | 0.017 |

**TABLE IV—Effect of Adding Magnesium After Carbide Treatment (Basic Crucible)**

| Heat No. | Treatment Lb/Ton $CaC_2$ | *NiMg | FeSi | Analysis—(Per Cent) TC | Si | Mn | S | P | Tensile, psi | Brinell Hardness | Elongation in 2", % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 381-1 | — | — | 30 | 3.89 | 3.44 | .220 | .014 | .038 | 12,500 | 87 | 0 |
| 381-2 | — | 28 | 18 | 3.57 | 3.28 | .178 | .009 | .011 | 67,000 | 170 | 11 |
| 381-3 | 30 | — | 30 | 3.92 | 3.49 | .202 | <.005 | .040 | 41,900 | 167 | 0 |
| 381-4 | 30 | 20 | 20 | 3.54 | 3.57 | .207 | <.005 | .040 | 73,200 | 187 | 8 |
| 390-1 | — | — | 30 | 3.91 | 3.32 | .196 | .018 | .046 | 14,300 | 90 | 0 |
| 390-2 | — | 28 | 18 | 3.58 | 3.09 | .192 | .009 | .045 | 68,900 | 174 | 10 |
| 390-3 | 30 | — | 30 | 3.45 | 3.34 | .191 | <.005 | .045 | 37,600 | 137 | 0 |
| 390-4 | 30 | 20 | 20 | 3.44 | 3.02 | .191 | <.005 | .044 | 68,900 | 163 | 13 |
| 391-1 | — | — | 30 | 3.90 | 3.18 | .198 | .011 | .044 | 15,070 | 95 | 0 |
| 391-2 | — | 28 | 18 | 3.32 | 3.16 | .199 | .006 | .043 | 72,100 | 174 | 11 |
| 391-3 | 30 | — | 30 | 3.57 | 3.19 | .197 | <.005 | .045 | 40,630 | 134 | 0 |
| 391-4 | 30 | 20 | 20 | 3.49 | 3.21 | .197 | <.005 | .040 | 70,150 | 179 | 7 |

*No. 2 Ni-Mg-Si Alloy (International Nickel Co.)

**TABLE V—Effect of Various Treatments (Basic Crucible)**

| Heat No. | Treatment Lb/Ton $CaC_2$ | MgO | *NiMg | FeSi | Analysis (Per Cent) TC | Si | Mn | S | P | Tensile, psi | Brinell Hardness | Elongation in 2", % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 383-1 | — | — | — | 30 | 4.08 | 3.62 | .224 | .012 | .043 | 16,200 | 92 | 0 |
| 383-2 | — | — | 28 | 18 | 3.53 | 3.32 | .225 | <.005 | .043 | 71,150 | 167 | 11 |
| 383-3 | 30 | 5 | — | 30 | 3.65 | 3.48 | .222 | <.005 | .046 | 56,000 | 170 | 0 |
| 383-4 | 30 | 5 | 10 | 26 | 3.37 | 3.58 | .222 | <.005 | .044 | 65,000 | 174 | 7 |
| 386-1 | — | — | — | 30 | 3.96 | 3.54 | .195 | .017 | .054 | 14,600 | 87 | 0 |
| 386-2 | — | — | 28 | 18 | 3.67 | 3.09 | .199 | .008 | .042 | 64,750 | 163 | 9 |
| 386-3 | 15 | 5 | — | 30 | 3.72 | 3.36 | .189 | <.005 | .053 | 54,400 | 149 | 2 |
| 386-4 | 15 | 5 | 10 | 26 | 4.03 | 3.36 | .195 | <.005 | .046 | 62,700 | 167 | 6 |

* No. 2 Ni-Mg-Si Alloy (International Nickel Co.)

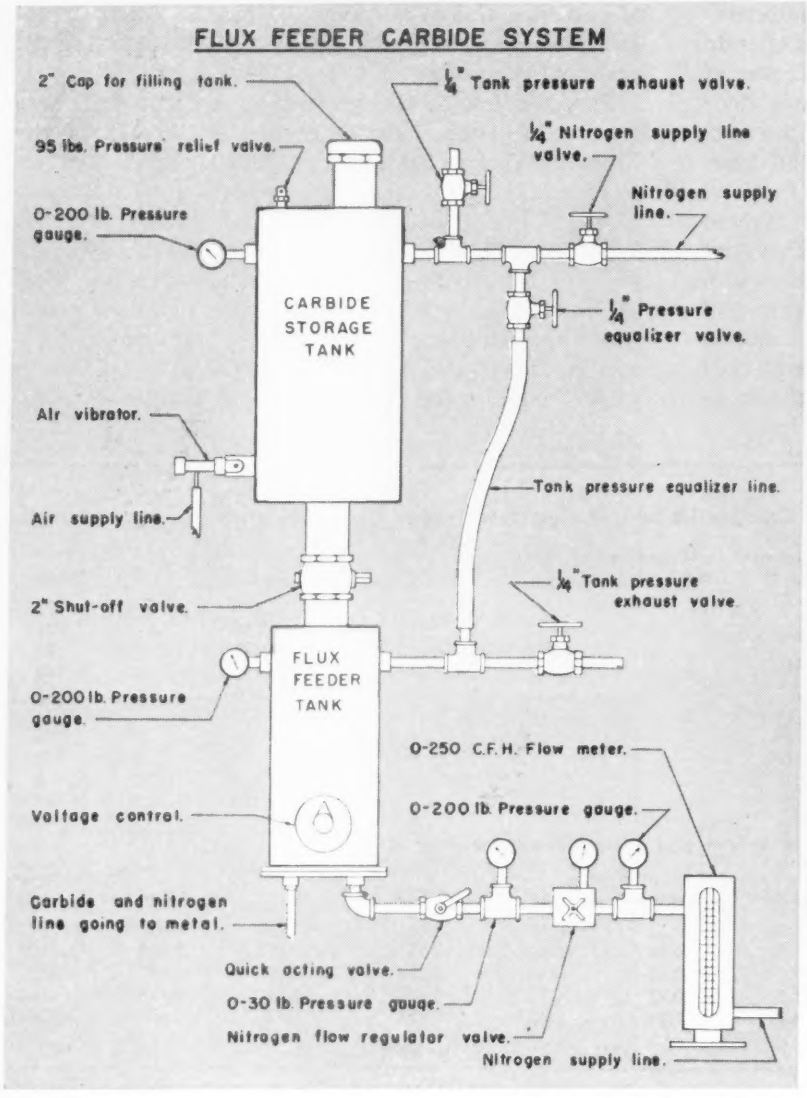
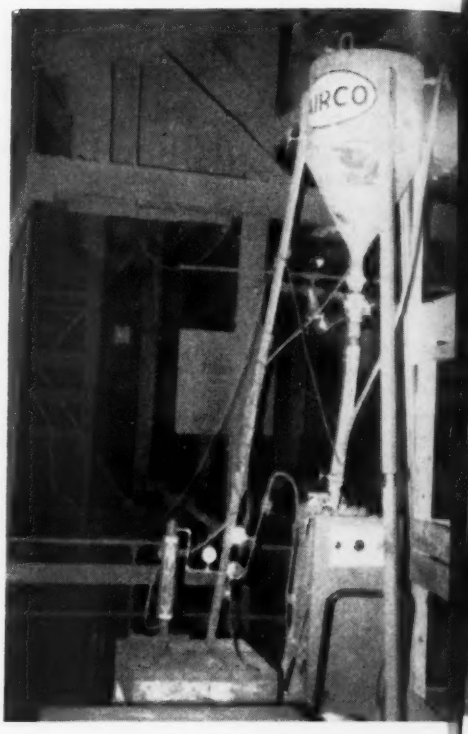



Fig. 8 (left)—Diagrammatic sketch of flux feeder carbide injection system

Fig. 9 (below)—The flux feeder system as set up at Lynchburg's Radford plant




on cupola melted iron at Lynchburg and Radford, Va., and induction furnace iron melted at Air Reduction's Murray Hill Laboratories has been very close. This has been due in large part to the free interchange of information and personnel in the furtherance of this investigation.

An injection apparatus consisting of a screw feeder, a pressurized feed hopper for the carbide, a nitrogen manifold, the necessary flow meters and gauges, and an injection tube assembly, as shown in Fig. 3, were installed in the Plow Foundry at the Lynchburg plant. Test work was started by injecting calcium carbide, carried in dry nitrogen gas, into the regular production iron in the Plow Foundry. At this time, a high percentage of the tonnage of iron melted in the Plow Foundry was used in the production of chilled castings. In this application, the proper chill depth, which is very important, was controlled by adding in the ladle a mixture of ferro-silicon (75 per cent silicon) and ferro-chromium (60 per cent chromium) to a base iron of this approximate composition: 1.60 per cent silicon, 0.08 per cent sulphur, 0.15 per cent phosporus, 0.70 per cent manganese, and 3.40 per cent total carbon.

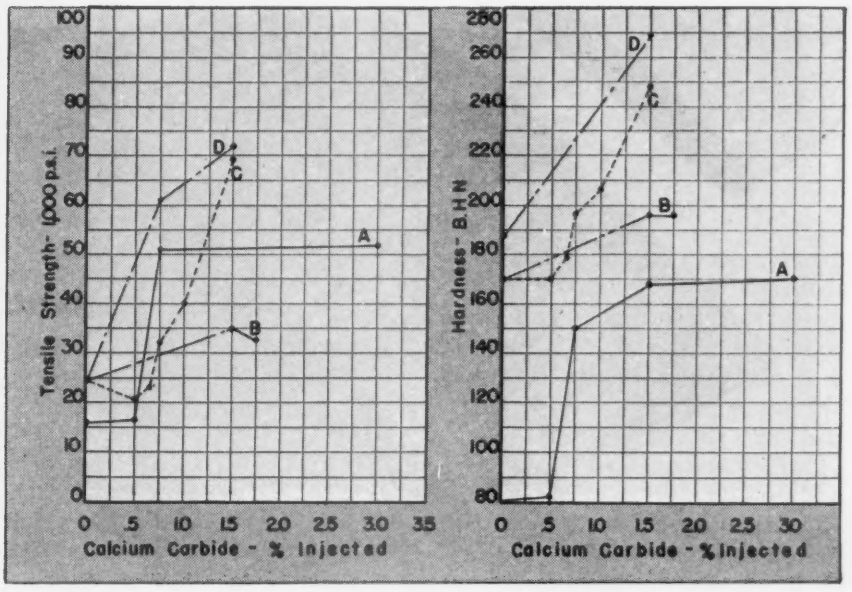
The alloy addition was varied to give the proper chill depth to the castings. Usually, the addition was 4 lb of ferrochromium and 2 lb of ferrosilicon in 1600 lb of iron. When calcium carbide was injected, it was found that the chilling tendency of the iron was so reduced that it required as much as 20 lb of ferrochromium and no ferrosilicon in 1600 lb of iron to produce the minimum (*Please turn to page* 241)

**TABLE VI—Effect of Adding Rare Earth Oxides to Carbide-Magnesia Mixture (Basic Crucible)**

| Heat No. | Treatment Lb/Ton $CaC_2$ | MgO | REO | Analysis (Per Cent) FeSi | TC | Si | Mn | S | P | Tensile, psi | Brinell Hardness | Elongation in 2", % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 443-1 | — | — | — | 30 | 3.84 | 3.35 | .211 | .020 | .045 | 12,000 | 85 | 0 |
| 443-1 | 15 | 5 | 1 | 30 | 3.66 | 3.25 | .212 | .005 | .042 | 64,000 | 163 | 6 |
| 437-1 | — | — | — | 30 | 3.78 | 3.32 | .198 | .013 | .048 | 12,950 | 87 | 0 |
| 437-3 | 15 | 5 | 1 | 30 | 3.59 | 3.27 | .197 | .005 | .053 | 64,750 | 167 | 6 |

g. 10—Preparing for carbide injection. raphite tube has a clay-graphite sleeve

Fig. 11—Fractures of tensile test specimens. Left, base iron. Center, treated with $CaC_2$. Right, treated with $CaC_2$ and nickel-magnesium alloy




Figs. 12, 13—Effect of amount of $CaC_2$ on tensile strength and hardness of four irons. Curve *A* is an induction furnace iron: TC 4.00; Si 2.00; Mn 0.20; S 0.02; P 0.0045. Treated with 0.25% MgO, inoculated with 1.5% FeSi. Curves *B*, *C* and *D* are acid cupola irons: TC 3.60; Si 1.60; Mn 0.50; S 0.08; P 0.45. *B* treated with $CaC_2$ alone. *C* treated with $CaC_2$ plus 0.25% MgO. *D* treated with $CaC_2$ plus 0.25% MgO plus 0.05% of rare earth oxides. In all cases 1.5% ferrosilicon was added to the irons late

**TABLE VII—Improvement in Physical Properties of Mixture of Acid and Basic Cupola Melted Iron by Calcium Carbide Injection**

| | Chemistry | | | | | Physical Properties | | | | | Treatment | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ladle Number | Si | S | P | Mn | Tc | Tensile | Yield | Elong | RA | Bhn | % $CaC_2$ | % REO | % MgO | % Ni Mg | % Fe Si |
| L-19-1 | 2.58 | .052 | .13 | .43 | 3.67 | 18,200 | 15,000 | 0 | 0 | 143 | 0 | 0 | 0 | 0 | 1.5 |
| L-19-2 | 2.02 | .030 | .12 | .49 | 3.67 | 36,500 | 26,500 | 1.0 | 0 | 170 | 1.3 | 0.05 | 0 | 0 | 1.5 |
| L-19-3 | 2.15 | .012 | .14 | .44 | 3.67 | 88,600 | 66,000 | 1.0 | 1.1 | 255 | 1.3 | 0.05 | 0 | 0.5* | 1.25 |
| L-20-1 | 2.15 | .052 | .09 | .39 | 3.72 | 17,000 | — | 0 | 0 | 140 | 0 | 0 | 0 | 0 | 1.5 |
| L-20-2 | 2.32 | .012 | .10 | .39 | 3.72 | 20,100 | — | 0 | 0 | 143 | 1.5 | 0.16 | 0 | 0 | 1.5 |
| L-20-3 | 2.46 | .011 | .10 | .40 | 3.68 | 103,600 | 69,000 | 2.5 | 2.3 | 262 | 1.5 | 0.16 | 0 | 0.5† | 1.25 |
| L-23-1 | 2.95 | .063 | .50 | .46 | 3.54 | 28,280 | — | — | — | 179 | 0 | 0 | 0 | 0 | 1.5 |
| L-23-3 | 3.22 | .012 | .50 | .46 | 3.54 | 35,600 | (f) — | — | — | 196 | 1.56 | 0 | 0 | 0 | 1.5 |
| L-24-1 | 3.06 | .070 | .50 | .46 | 3.43 | 26,480 | — | — | — | 179 | 0 | 0 | 0 | 0 | 1.5 |
| L-24-3 | 3.21 | .009 | .50 | .46 | 3.47 | 32,300 | — | — | — | 196 | 1.75 | 0 | 0 | 0 | 1.5 |
| L-30-4 | 2.64 | .010 | .40 | .43 | 3.47 | 20,600 | — | — | — | 170 | 0.5 | 0 | 0.20 | 0 | 1.5 |
| L-31-4 | 2.80 | .010 | .50 | .43 | 3.51 | 23,200 | — | — | — | 179 | 0.66 | 0 | 0.25 | 0 | 1.5 |
| L-32-4 | 2.91 | .005 | .50 | .43 | 3.55 | 32,100 | — | — | — | 196 | 0.75 | 0 | 0.25 | 0 | 1.5 |
| L-34-4 | 2.79 | .014 | .50 | .43 | 3.33 | 40,400 | — | — | — | 207 | 1.00 | 0 | 0.25 | 0 | 1.5 |
| L-38-4 | 2.51 | .006 | .40 | .44 | 3.69 | 68,700 | — | — | — | 248 | 1.50 | 0 | 0.25 | 0 | 1.5 |
| L-40-4 | 3.21 | .005 | .49 | .44 | 3.56 | 26,100 | — | — | — | 207 | 1.00 | 0 | 0.25 | 0 | 3.0 |
| L-41-4 | 3.58 | .005 | .56 | .37 | 3.19 | 43,200 | — | — | — | 223 | 1.50 | 0 | 0.25 | 0 | 3.0 |
| L-44-4 | 3.02 | .011 | .46 | .43 | 3.35 | 27,200 | — | — | — | 179 | 0.75 | 0.05 | 0.25 | 0 | 1.5 |
| L-39-4 | No Sample | | | | | 40,000 | (f) — | — | — | 228 | 1.00 | 0.05‡ | 0.25 | 0 | 1.5 |
| L-46-4 | 2.91 | .012 | .40 | .44 | 3.30 | 48,200 | — | — | — | 217 | 1.00 | 0.037 | 0.25 | 0 | 1.5 |
| L-42-4 | 3.97 | .004 | .54 | .41 | 3.29 | 60,800 | — | — | — | 228 | 0.75 | 0.05‡ | 0.25 | 0 | 3.0 |
| L-43-4 | 3.54 | .004 | .46 | .43 | 3.42 | 72,000 | — | — | — | 269 | 1.50 | 0.05 | 0.25 | 0 | 3.0 |

*No. 1 Nickel Magnesium Alloy. †No. 2 Nickel Magnesium Alloy. ‡T-Compound—REO—80%, Calcium Boride—12%, Sodium Nitrate —8%. f—Flawed bar.

# ZIRCON and

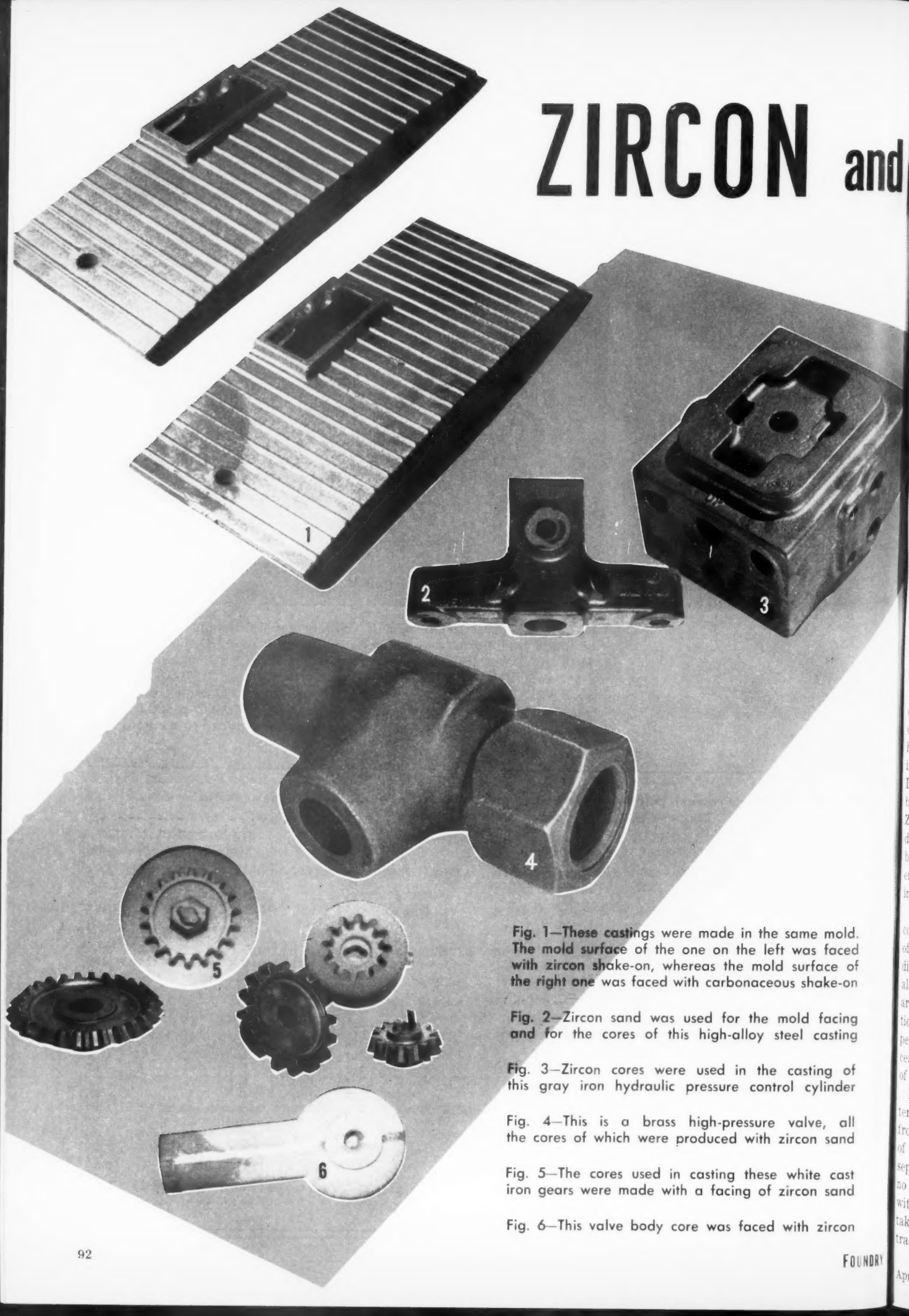



Fig. 1—These castings were made in the same mold. The mold surface of the one on the left was faced with zircon shake-on, whereas the mold surface of the right one was faced with carbonaceous shake-on

Fig. 2—Zircon sand was used for the mold facing and for the cores of this high-alloy steel casting

Fig. 3—Zircon cores were used in the casting of this gray iron hydraulic pressure control cylinder

Fig. 4—This is a brass high-pressure valve, all the cores of which were produced with zircon sand

Fig. 5—The cores used in casting these white cast iron gears were made with a facing of zircon sand

Fig. 6—This valve body core was faced with zircon

By W. M. PETERSON
*Chemist*
M. A. Bell Co., St. Louis

# ts Foundry Applications

*For certain applications zircon is a most useful molding material because it combines high refractory value, heat conductivity and density with low expansion and good resistance to being wetted by molten metal. The author describes how to make best use of these properties*

SINCE the very beginning of the foundry industry, silica sand with varying amounts of clay has been the molding media of the foundryman. Some improvements in the types of silica and clay have come about through the ages, but essentially the foundryman has been limited by a fusion point of 3250° F. If the design or weight of a particular casting required a molding surface with a higher fusion point, the foundryman was sunk. The casting was poured with a prayer and the hope that the chippers and grinders could overcome the shortcomings of the sand mold to make the casting saleable.

Naturally, this method was very costly, so other refractory materials were tried in the rough spots. Many were tried but for one reason or another they failed. In the early thirties, zircon, which at that time was a rare mineral, was tried and proved to have outstanding merit. However, the introduction of zircon into general foundry use was very slow due to high price and the woeful lack of dissemination of information regarding its virtues. After World War II the supplies of zircon became larger and the price became more in a range foundrymen could afford. Zircon prices, while cheap compared to prewar levels, do not and never will approach those of silica sand, but where zircon is needed it will prove to be considerably cheaper than silica in terms of finished casting cost.

A little insight in the occurrence and winning of zircon will give the foundryman a better appreciation of a product he takes for granted. Zircon is widely distributed in nature, being found in small quantities almost everywhere. Workable commercial deposits are found in Florida and Australia. The concentration of zircon in the Australian deposits is about 15 per cent whereas that in Florida runs only 1½ per cent, but the market price is about the same because of the long haul from Australia.

Extracting these small percentages is no easy matter. The sands containing zircon are dredged up from 40 to 60 feet below ground level. Concentration of the heavy minerals is accomplished with spiral separators which produce a centrifuging action with no moving parts. Final separations are accomplished with magnets and electrostatic separators, which take advantage of the differences in electrostatic attraction of different minerals to accomplish an almost perfect separation. This is a simple picture, but in the procedure many tons of sand and water must be handled to obtain one ton of zircon. The cost would be prohibitive were it not that other minerals more valuable than zircon are being produced in the same operation. Zircon is the by-product and is the last to be removed. It just tags along through the concentrating procedures and finally becomes worth recovering at the very end.

Zircon, as produced by standard producers for foundry use, is very close to 99 per cent zirconium silicate and is separated by electrostatic methods. From time to time zircons appear on the market which have been separated by means of oil flotation. This material has a rather high purity, but the oil coating on the grains makes it difficult to bind and it is almost impossible to obtain a reasonable green strength without the use of excessive amounts of binder. This material is easily identified because it has a tendency to float when sprinkled on water. Zircon, adulterated with silica sand in varying amounts, has been offered to the foundry trade at reduced prices. Naturally this material will not produce satisfactory results.

## Has Many Desirable Properties

The properties of zircon which make it highly desirable as a molding media and a mold coating are: High refractory value, high conductivity, high density, low expansion, and resistance to being wetted by molten metal.

The melting point of commercial zircon usually is close to 4000° F. This is considerably higher than the temperatures in the worst hot spots encountered in usual foundry practice. Fused core and mold surfaces are entirely eliminated by this property.

The high conductivity and high density of zircon should be discussed together because both tend to freeze the molten metal more rapidly. Zircon has about twice the heat conductivity and twice the density of silica sand, which means it can absorb about twice the amount of heat twice as fast. These properties give the foundryman a very useful tool for controlling directional solidification. Often zircon sand can be used to replace chills with considerable savings in initial cost. There is also a substantial saving in the cleaning room because of the extremely

fine finish which is always noted where zircon is used.

Expensive cast chills can often be replaced with zircon if sufficient inexpensive bar stock clippings are embedded in the zircon close to the mold or core surface. Controlling directional solidification with zircon has found wide application in the steel foundry but it is just as effective in gray iron and nonferrous foundry practice with the exception of aluminum, where little effect is apparent. When zircon is used to control directional solidification, no hard spots are found which would interfere with drilling or machining operations.

Zircon's low expansion—less than one-third that of silica—removes many of the headaches encountered with silica sand. In fact, the necessity of using several silica sand mixes in the same shop stems from the high expansion of silica. Most shops using zircon will require one mix for spotting in the mold and one for spotting on cores because of this low expansion. The necessary binding materials are all that need be added; further additions are definitely detrimental.

### Not Wetted by Molten Metal

One of the outstanding properties of zircon, which is often overlooked, is that it is not wetted by molten metal. Molten metal flows across zircon much like mercury across a table top. There is practically no friction or grabbing action. This is one of the reasons zircon core and mold washes are so effective.

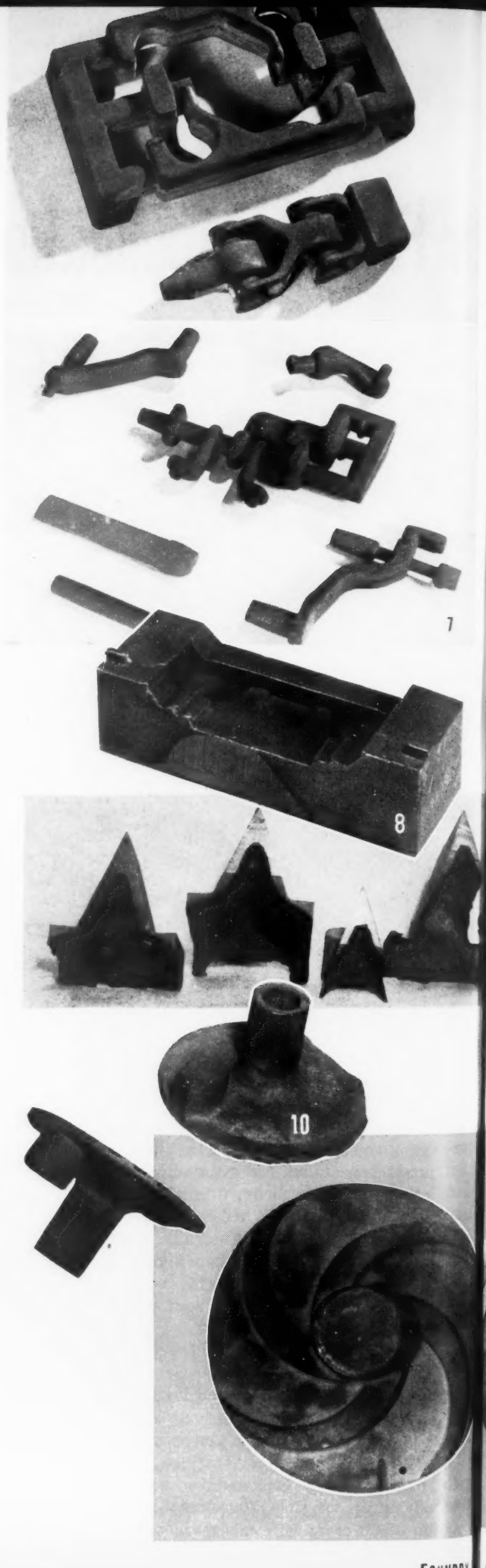
Working with zircon entails little change from general procedures, but certain facts should be taken into consideration. Zircon does not require as much water to temper as does silica sand. Due to its round grain, high density and affinity for most common binders, zircon requires less binding material than is ordinarily used. The fineness of zircon sand (AFS grain fineness number 115-120) precludes that longer than conventional mulling time is necessary to coat each grain with binder.

Due to the properties and uniformity of zircon sands, mixes have evolved over the years which will work in 99 per cent of the foundry applications. Fortunately, their number is small and the ingredients easily obtained in all sections of the country.

For spotting in or facing steel molds the following mix has had wide acceptance in steel foundries producing castings weighing from a few pounds up to 90,000 pounds: 100 lb zircon sand, 2¼ lb western bentonite, ½-lb corn flour, 3 lb water. This mixture will give 5½ lb green strength and sufficient hot strength for the largest castings.

In green sand molding the type of metal being poured seems to have little effect on zircon sand. One easily worked mix that will serve equally well for steel, gray iron and nonferrous molding includes: 100 lb zircon sand, 1½ lb western bentonite, 1½ lb water. This mixture gives a strength of 5½ lb and a permeability of 42. The dry permeability is 51. This mixture may be stored in an air-tight container for an indefinite period of time without ill effects. Small users may prepare a muller full and use it as conditions warrant.

In preparing a core sand mixture, consideration



must be given to the amount of hot strength required for the particular job. Zircon sand itself possesses a certain native hot strength, probably due to its fineness. However, when this hot strength is not sufficient, western bentonite must be added. Western bentonite, in conjunction with zircon, exhibits a peculiar phenomenon at high temperatures in that the mixture will reach a peak hot strength rather rapidly and maintain this strength over a long period of time.

Cores which do not require high hot strength can be made from the following mixture: 100 lb zircon sand, 0.7 lb core oil, 0.7 lb corn flour, 2 lb water. For cores surrounded by heavy metal sections requiring high hot strength, the following mixture should be used: 100 lb zircon sand, ½-lb corn flour, ½ lb western bentonite, 1 lb core oil, 2½ lb water.

Either of these two core sand mixtures has sufficient green strength to make a 1-in. core, 4 in. high that will not sag when stood alone on a core plate and baked. The tensile strength is greater than that obtainable on a universal sand strength machine. Specimen cores bake thoroughly in 35 minutes at 450° F. Shakeout is relatively easy where either mixture is used.

Zircon finds wide use as a refractory in core and mold washes. For this purpose the zircon is ground in a ball mill usually to pass a 200-mesh screen. This material, while finer than the silica usually used for this purpose, presents a suspension problem due to its density. Several manufacturers of washes have overcome this problem and excellent prepared zircon washes are available to the foundry industry. Those wishing to compound their own wash may do so if the proper materials are selected. All that is necessary is a good wash base, i.e., one containing a suspending agent and binder, but no refractory. To this is added water and zircon flour, or a combination of zircon sand and zircon flour where heavy torching is used.

The following mixture has been used successfully by a number of steel foundries for several years: 17 lb plastic wash base (silica free), 32 lb zircon flour, 33 lb zircon sand, 18 lb water. The ratio between sand and flour may be varied, if desired. This mixture will produce a baume of approximately 90°. While this may sound quite high, the mixture is surprisingly liquid and easy to apply.

**ZIRCON MIXTURES FOR VARIOUS APPLICATIONS**

FACING, STEEL CASTING MOLDS

| | |
|---|---|
| Zircon sand | 100.00 lb |
| Western bentonite | 2.25 |
| Corn flour | 0.50 |
| Water | 3.00 |

GREEN SAND MOLDING
(Steel, Gray Iron and Nonferrous)

| | |
|---|---|
| Zircon sand | 100.00 lb |
| Western bentonite | 1.50 |
| Water | 1.50 |

CORE SAND—MODERATE HOT STRENGTH

| | |
|---|---|
| Zircon sand | 100.00 lb |
| Core oil | 0.70 |
| Corn flour | 0.70 |
| Water | 2.00 |

CORE SAND—HIGH HOT STRENGTH

| | |
|---|---|
| Zircon sand | 100.00 lb |
| Corn flour | 0.50 |
| Western bentonite | 0.50 |
| Core oil | 1.00 |
| Water | 2.50 |

CORE AND MOLD WASH

| | |
|---|---|
| Plastic wash base (silica free) | 17.00 lb |
| Zircon flour | 32.00 |
| Zircon sand | 33.00 |
| Water | 18.00 |

Fig. 7—This illustration shows a number of typical examples of cores that were made from zircon sand

Fig. 8—Zircon sand was used on core surfaces of this rubber mold, which was cast in nickel silver

Fig. 9—The gray iron wedge castings shown here were bled three minutes after pouring. The casting on the left was made in zircon and weighed 8¾ lb. The right casting was made in washed and dried silica, GF 68, and weighed 4¾ lb

Fig. 10—Zircon molding sand used around bosses on these gray iron castings eliminated a 10-lb riser that fed two castings. The gating was not changed

Fig. 11—Shrinks were produced by the boss on the bronze impeller casting on the left and are still apparent in the center casting, although a metal chill was used on boss. Zircon sand covering boss on casting at right eliminated all shrinks

# Shaking Out . .

# Cleaning . . .

# Welding . . . STEEL CASTINGS

*Recommendations as to the types of electrodes suitable for welding steel castings and the procedure to be followed in welding are discussed in this third of a series of articles*

FOR many years low-voltage current furnished by motor-generators was standard for arc welding, but today "ac-dc" rectifiers are rapidly superseding motor-generators as sources of dc welding current. In both types, means are provided to vary the amperage at will, and to reverse its direction to suit the type of electrode coating being used.

Some coated electrodes work best on what is called "straight polarity," in which the electrode is the negative pole, and the work positive. Others require "reversed polarity" with the electrode positive, the work negative. The greater amount of heat is developed at the positive pole, and in some cases reversed polarity is desired in order to melt refractory coatings more nearly at the same rate as the core wire than would be possible with straight polarity.

When suitable coatings were developed, it became possible to use certain types of electrodes not only on either reversed or straight polarity, but on ac circuits as well, and alternating current machines are now very widely used. For the most part, the current is furnished by simple transformers, provided with means of varying the amperage at will.

One of the chief reasons for the change from motor-generator sets to either rectifiers or ac transformers, is that the former are much more expensive to maintain and to operate than either of the other types. The motor-generator sets also consume current all the time they are in operation since even when idling, the motors use some current, whereas transformers and rectifiers take current only while the arc is maintained.

In some cases the alternating current machine is at a certain disadvantage, because it uses only one phase of a two or three phase circuit. As a result, when only one or two welders are required in a shop, the utilization of current is less efficient than with direct-current motor-generator sets. If there are a number of machines in use, however, all three phases can be utilized, so that the load on the line is better balanced.

Not only are transformers more economical than motor-generator sets, but it has been found that when welding with alternating current, less trouble is ex-

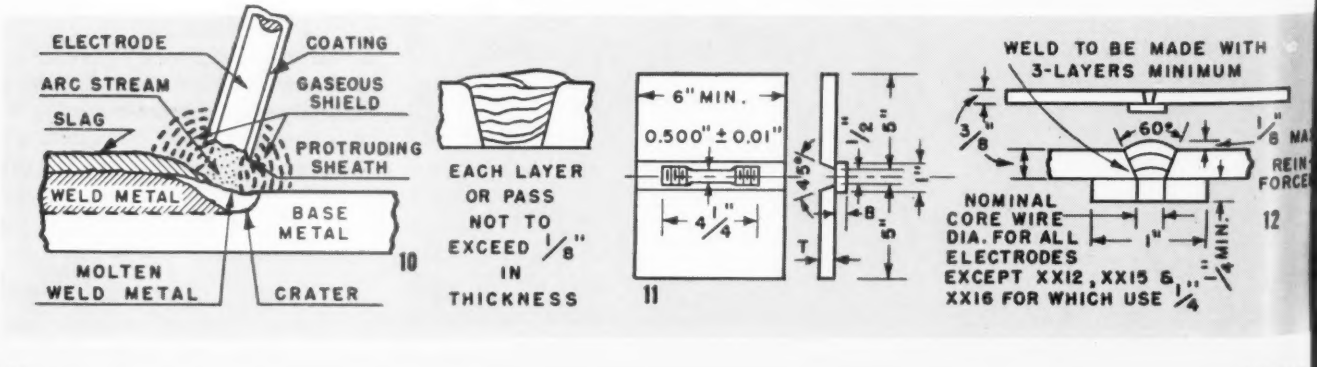
Fig. 10—Showing how the electrode coating extends beyond the rod to shield the arc from air contact

Fig. 11—Requirements for preparation of weld-metal tension test specimens. (ASTM A233-48 T Spec.)

Fig. 12—Test joint used for the guided-bend test

Fig. 13—Preparation of a fillet-weld test specimen

Fig. 14—"String" bead is produced by moving rod in straight path. Electrode moved from side to side as well as laterally results in "weave" bead (Fig. 15)



perienced with what is known as "arc blow." This is the deflection of the arc by eddy-currents set up in the work, and is particularly troublesome when welding near the edge of a flat piece, or in corners and restricted places, and when high currents are required for welding in thick sections. Arc blow causes an unsteady, flickering arc, and is likely to result in the formation of blow-holes and the inclusion of slag particles in the weld, at the point where the disturbance occurred. With direct current circuits, arc blow can be reduced somewhat by changing the angle between the electrode and the work, but it is undoubtedly far less troublesome with ac current.

When metallic arc welding was first developed, uncoated electrodes of dead soft steel or "Swedish" wrought iron were used. Because more heat is developed at the positive than at the negative pole of a dc arc, bare electrodes were used on straight polarity (work positive) to secure proper penetration—that is, to melt the base metal to a sufficient depth to form a strong bond between it and the weld deposit. With insufficient penetration, a weld is hardly more than a soldering job.

With bare or very lightly coated ("sul-coated") electrodes, the arc is comparatively unsteady, and as the droplets of molten metal are entirely unprotected from the atmosphere, they rapidly absorb both nitrogen and oxygen. The latter oxidizes out much of the silicon, manganese and carbon of the electrode, and forms a great deal of iron oxide, which is absorbed by the fluid weld deposit. As a result, the strength and ductility of the metal leaves much to be desired, and it is seldom entirely free from gas holes and slag inclusions. To obviate the difficulties, various kinds of electrode coating have been developed, and today bare electrodes are seldom if ever used for repair welding of steel castings.

The functions of electrode coatings are to form a protective sheath around the end of the electrode, to surround the arc with nonoxidizing atmosphere, and to protect the deposited metal from oxidation by covering it with a layer of slag. Most coatings melt somewhat more slowly than (*Please turn to page* 250)

## TABLE I—Standard Electrodes

| Core Wire Diam, In. | Length, In. |
|---|---|
| 1/16 | 9 or 18* |
| 5/64, 3/32 | 12 or 18* |
| 1/8, 5/32 | 14 |
| 3/16 | 14 or 18 |
| 7/32, 1/4, 5/16, 3/8 | 18 |

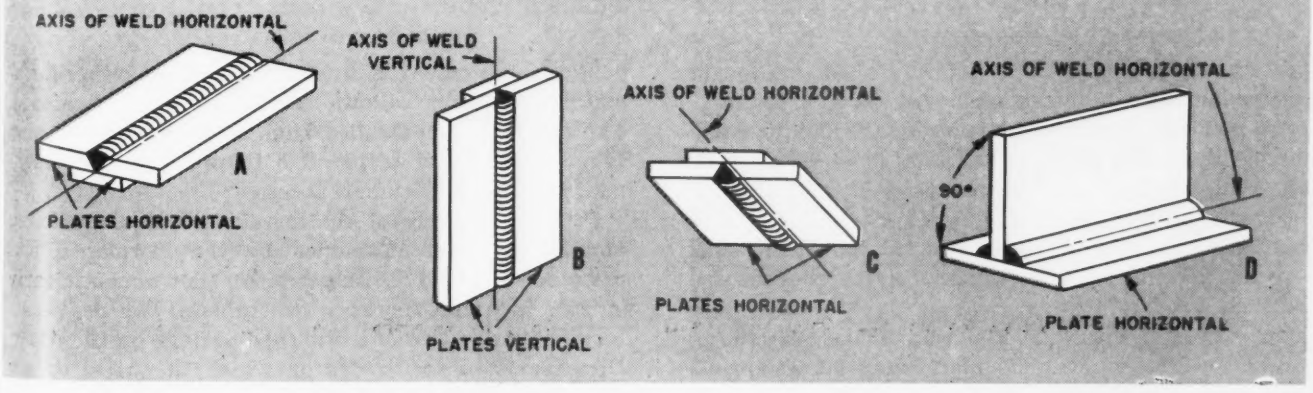
* On 18-in. lengths of these sizes, center gripping is standard.
For all other diameters, end gripping is standard.

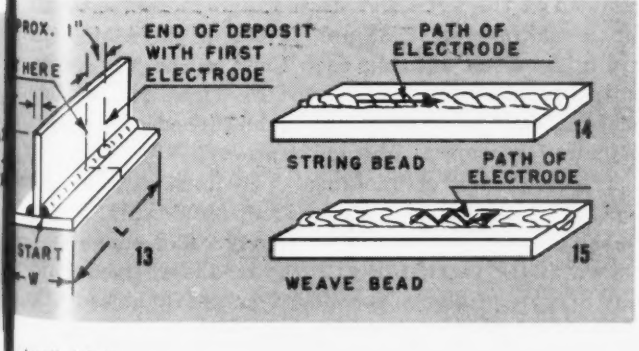
## TABLE II—Electrode Classification

| Electrode Classification | Type of Coating | Welding Positions for Which Suitable | Current To Be Used |
|---|---|---|---|
| E 4510 | Sulcoat, or light coat | F, V, OH, H | Generally dc, straight polarity |
| E 4520 | Sulcoat, or light coat | H Fillets, F | Generally dc, straight polarity |
| E 6010 | High celluose, sodium | F, V, OH, H | dc, reversed polarity only |
| E 6011 | High cellulose, potassium | F, V, OH, H | ac or dc, reversed polarity |
| E 6012 | High titania, sodium | F, V, OH, H | ac or dc, straight polarity |
| E 6013 | High titania, potassium | F, V, OH, H | ac or dc, straight polarity |
| E 6015 | Low hydrogen, sodium | F, V, OH, H | dc, reversed polarity only |
| E 6016 | Low hydrogen, potassium | F, V, OH, H | ac or dc, reversed polarity |
| E 6020 | High iron oxide | H Fillets | ac or dc, straight polarity |
| | | F | ac or dc, either polarity |
| E 6030 | High iron oxide | F | ac or dc, either polarity |

Reversed polarity = electrode positive
Straight Polarity = electrode negative

H = Flat (a) (flat groove weld)
F = Vertical (b) (vertical groove weld)
V = Overhead (c) (overhead groove weld)
OH = Horizontal H-Fillets = Horizontal fillets (d)




## TABLE III—Minimum Requirements

| Electrode Classification | Tensile Strength Min. psi | Yield Point Min. psi | Elong. in 2 in. % Min. |
|---|---|---|---|
| E 4510 | 45,000 | not specified | 5 |
| E 4520 | 45,000 | not specified | 5 |
| E 6010 | 62,000 | 52,000 | 22 |
| E 6011 | 62,000 | 52,000 | 22 |
| E 6012 | 68,000 | 55,000 | 17 |
| E 6013 | 68,000 | 55,000 | 17 |
| E 6016 | 68,000 | 55,000 | 22 |
| E 6015 | 68,000 | 55,000 | 22 |
| E 6020 | 62,000 | 52,000 | 25 |
| E 6030 | 62,000 | 52,000 | 25 |

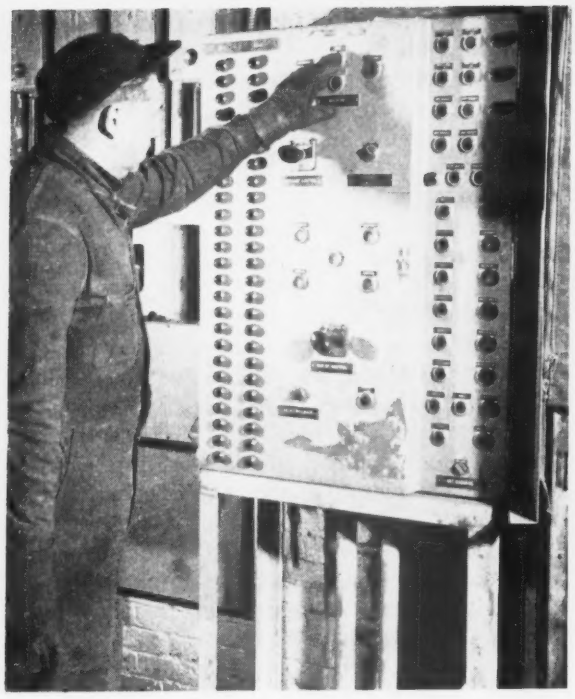


Fig. 1—Operation of the indexing molding machine is directed from this central panel control board

Fig. 2—Valves at left are manipulated by operator to pick up empty flasks from gravity roll conveyor

# HIGH-SPEED MOLDING

## *Is Done Automatically*

By WILLIAM G. GUDE
*Managing Editor*
*FOUNDRY*

HIGH-SPEED production of uniformly rammed, medium-size molds is achieved by the Symington-Gould Corp. with an automatic molding unit recently installed at its Depew, N. Y., steel foundry. This company for many years has been a major producer of railway specialties—couplers, bolsters, side frames, etc. It also supplies general industrial steel castings, as well as armor castings for the defense program.

The new equipment is employed primarily in making molds for freight car couplers and miscellaneous freight car castings, although the flasks used are of a size suitable for making steel castings of other types and sizes. These flasks measure 44 x 60 in., and the copes and drags are each either 15 or 20 in. deep. They are barred and used without bottom boards. The accompanying illustrations show the various operations in molding couplers, two of which are produced per mold. This sequence of views was made without sand in the flasks.

As now operated, the unit turns out a cope or a drag in 75 seconds—the equivalent of a complete mold in 2½ minutes. This interval is constant because once the equipment is started, it operates on an automatic cycle that follows a definite timed sequence. The machine is controlled from a central panel board (Fig. 1) where it is possible to interrupt the automatic cycle at any time if necessary.

Principal feature of the installation is an indexing molding machine developed by the Herman Pneumatic Machine Co., Pittsburgh. As shown most clearly in Fig. 5, it incorporates two tables. The drag pattern is mounted on one, the cope pattern on the other. Dimensions of the plates on which the patterns are mounted are 58 x 78 in. Both the cope and drag are rammed at the left-hand station, and the patterns are drawn at the right. The unit pivots at the center and can be revolved to bring each flask to the jolt station and then continue around to the right for pattern drawing. In Fig. 5 the machine has turned part way in bringing the cope to the jolt station.

The sequence of molding operations starts with placing an empty flask on the right-hand table. Empty flasks are picked up from a gravity roller conveyor—shown at the right in Fig. 2—by means of pneumatically operated tongs suspended from an air hoist which

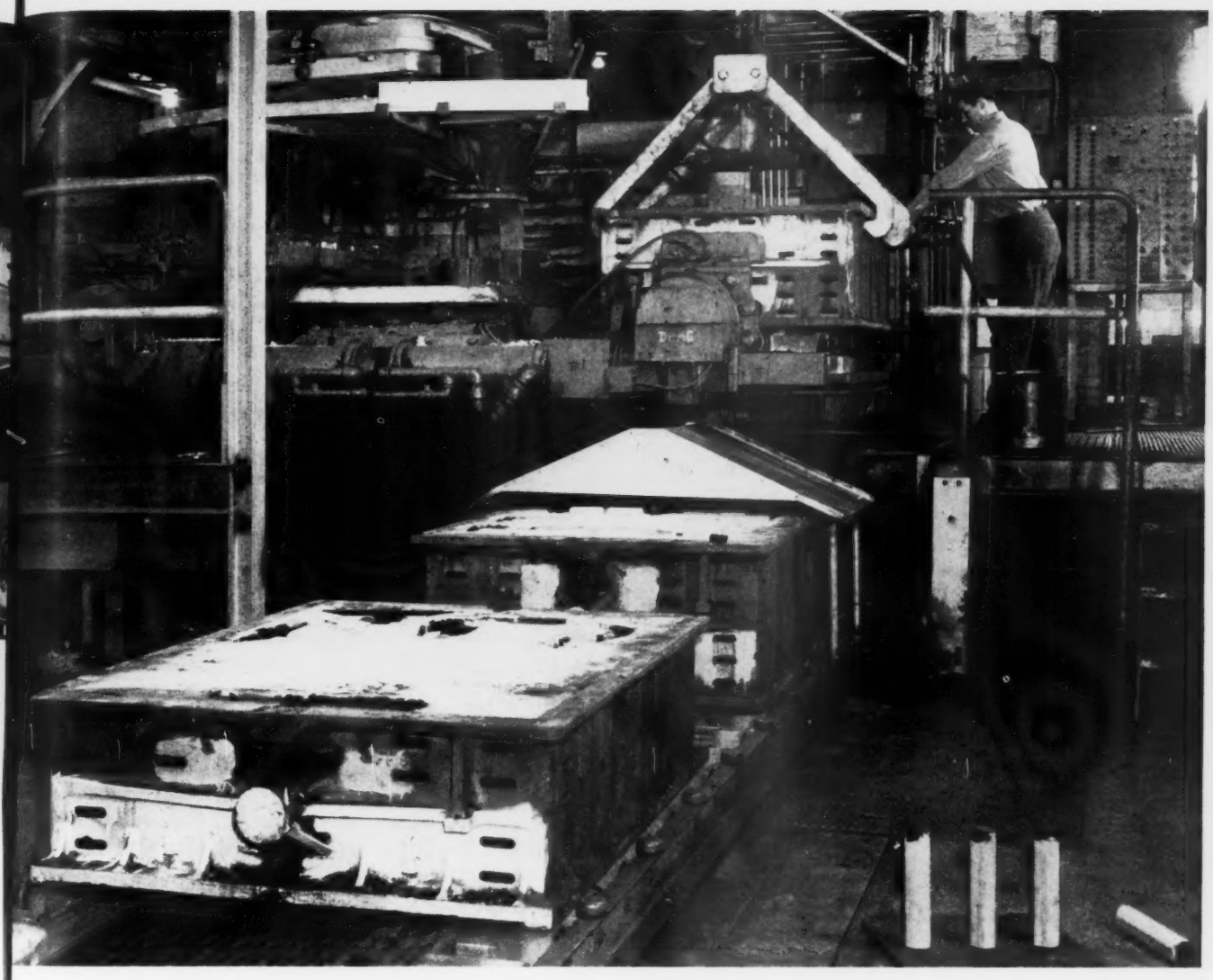


Fig. 3—General view of automatic molding unit at Symington-Gould Corp. steel foundry, Depew, N. Y.

travels over a monorail. Manipulation of the hoist is controlled by an operator from the central valve station seen at the left, Fig. 2. Operation of the hoist is facilitated by a limit switch which positions the tongs directly above the flask to be picked up.

Once the flask is lowered into place (Fig. 4), it is held by pneumatically operated clamps at each end. The machine then is revolved to move the flask to ramming position. As the flask travels, an overhead batch hopper rotates at the same speed, and a vibrator riddles facing sand over the pattern. This hopper previously had been filled by a conveyor belt leading from a facing sand storage bin located about 25 feet out in front of the machine. A timer automatically starts and stops the conveyor belt so that the correct amount of sand will be delivered to the batch hopper.

Meanwhile another batch hopper has been filled with backing sand—also by automatic timer—from a 60-ton-capacity bin at the rear of the machine. This hopper moves forward over the flask (Fig. 7) and a clamshell gate at the bottom opens to deposit the sand. At this point the jolting action starts and the hopper is retracted to receive another charge of sand.

After about 15 jolts the action is interrupted while mold weights are lowered onto the flask by a horizontally mounted pneumatic hoist. These weights (Fig. 8) consist of 36 90-pound tapered blocks held loosely in a frame. As jolting is resumed, the weights

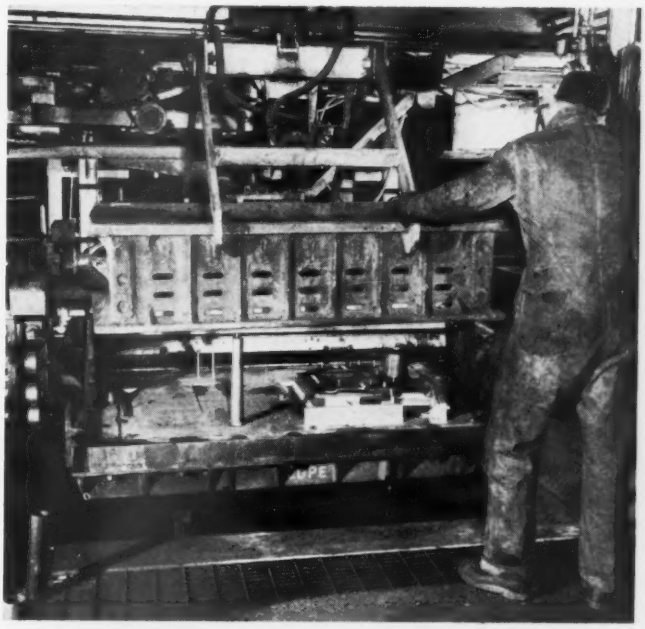


Fig. 4—Flask being lowered in place preparatory to being revolved to bring it to ramming position

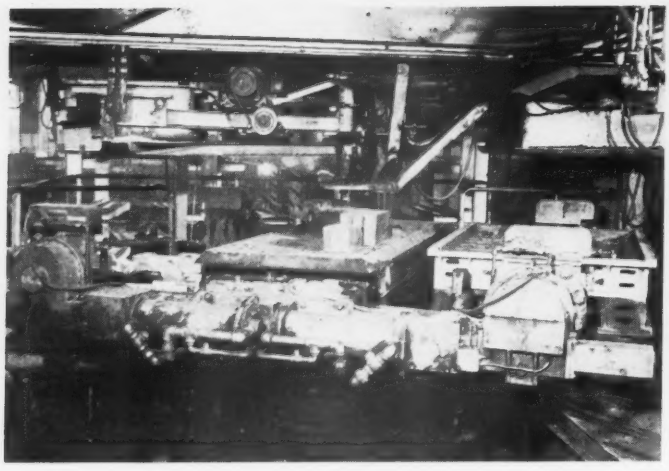


Fig. 5—This shows how the unit pivots at the center to transfer flask to and from ramming position

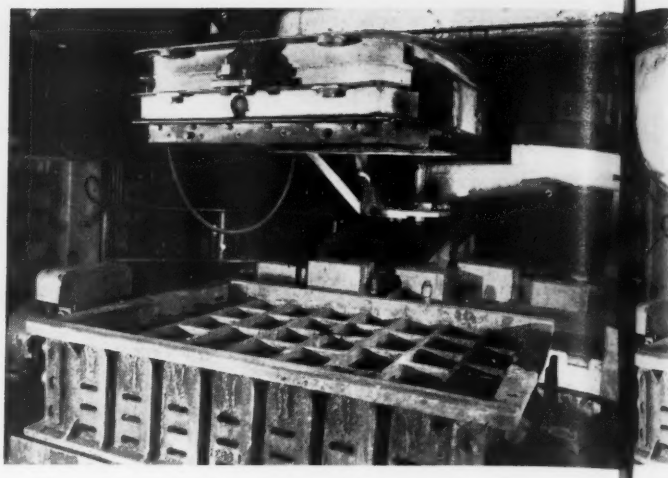


Fig. 6—Overhead hopper riddles facing sand over pattern as flask is rotated to ramming station

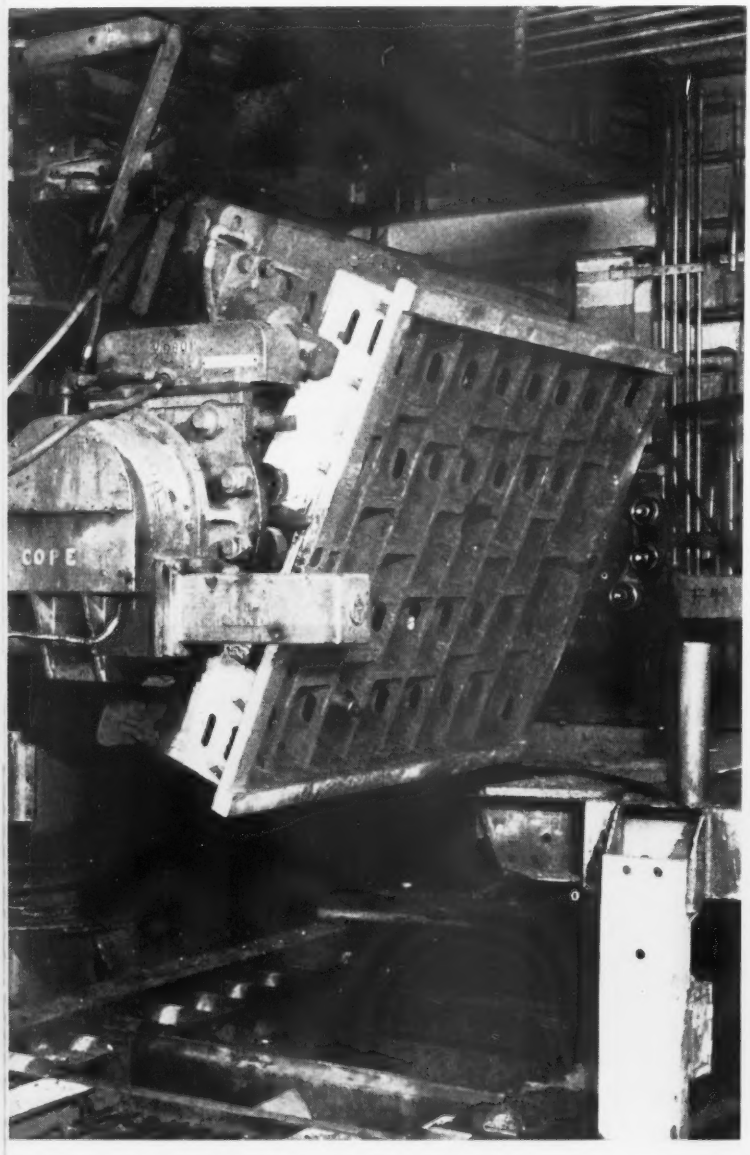



Fig. 9—After flask has been rammed it is rotated back to its original position to be rolled over. This shows a cope flask part way through the roll-over operation. Barred flasks need no bottom board

settle in the frame and compress sand in the upper section of the flask. Since the weights "float" on top of the sand, they can compensate for variations in height of the pattern. Use of ramming weights eliminates butting off of molds by hand rammer and striking off, as flask grids are set 2 in. lower than flask ends and sides. The weight frame also incorporates a 10-in. disk to form the pouring cup seat on cope molds.

At the completion of ramming, the weights are raised and the flask is rotated to the pattern drawing station. There it is rolled over (Fig. 9), and equalizer beams are raised (Fig. 10) to support the mold during the subsequent pattern draw. The next operation is the release of the clamps that hold the flask to the table, followed by vibration of the pattern and lowering of the mold (Fig. 11). Lowering speed of the draw operation is increased gradually as the mold is freed from the pattern by timed vibration. At the

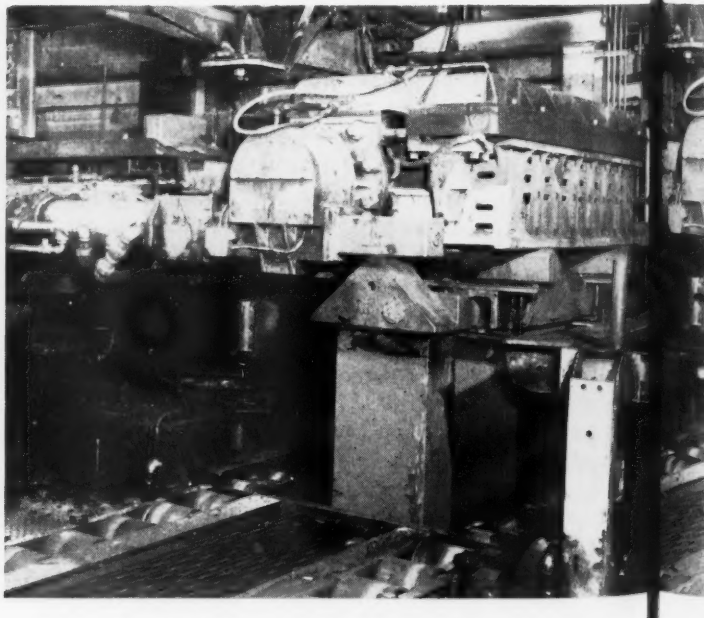


Fig. 10—Equalizer beams are raised from the floor level and support the flask during pattern drawing

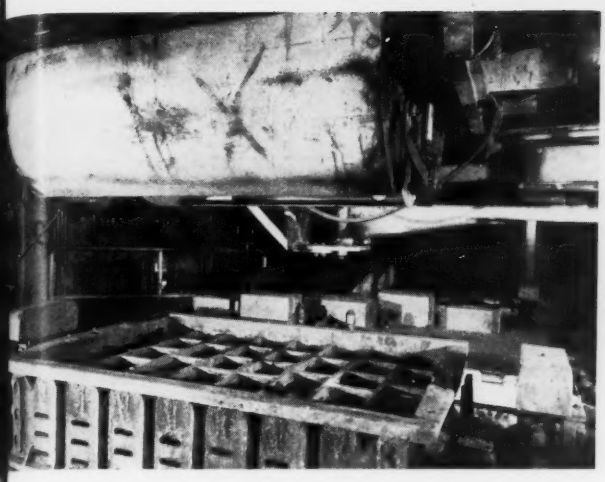


Fig. 7—Batch hopper about to open and deposit backing sand. Hopper is retracted for refilling

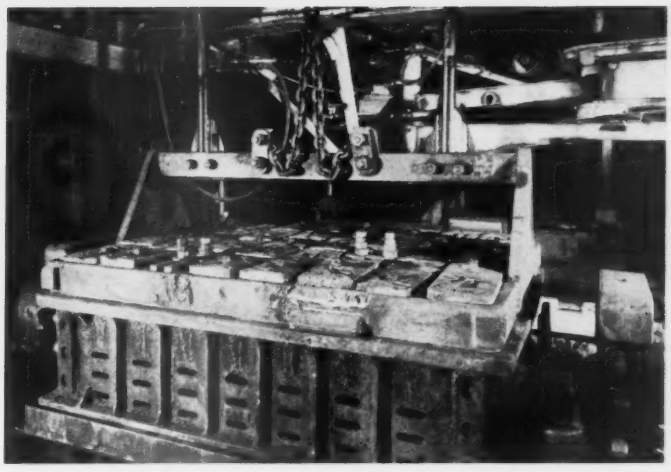


Fig. 8—Weights, resting on top of the mold during part of the jolting, compress upper section of sand

bottom of the descent a limit switch starts a power roll conveyor in operation, and the mold is moved out from the machine. The table again is rolled over and another flask is placed in position to repeat the molding cycle.

During the period involving pattern drawing, mold removal and positioning of a new flask, another flask is being rammed on the other side of the machine. Copes and drags alternate each other on the roll-out conveyor.

Core setters are stationed along the conveyor line. After cores have been placed in the drag, an adjoining cope is lifted by air hoist, rolled over, and the mold closed. At the end of the line the molds are picked up by crane and moved to the pouring floor.

Various safety devices have been incorporated in the system. A warning signal is sounded when the power roll conveyor is about to move out a mold, so that core setters will not be working on a traveling mold. Air-operated brakes are installed at both ends of the flask return gravity roll conveyor. At the far end, where flasks are deposited by crane, this prevents movement when chain slings are being released. The operator who transfers flasks to the machine, releases the brake at the near end to bring a flask in position to be picked up by the hoist. Another precautionary device is a safety lock employed at the raised position of the mold weights; it prevents accidental dropping while the weights are elevated.

This installation typifies the recent trend toward automatic control of foundry operations, to provide an improved quality product and better working conditions for steel foundry workers. The uniformity of molds, as the result of mechanical timing of each molding sequence, with castings produced being uniform and true to dimension, is regarded by Symington-Gould as a prime consideration, and ranking in importance with speed of production.

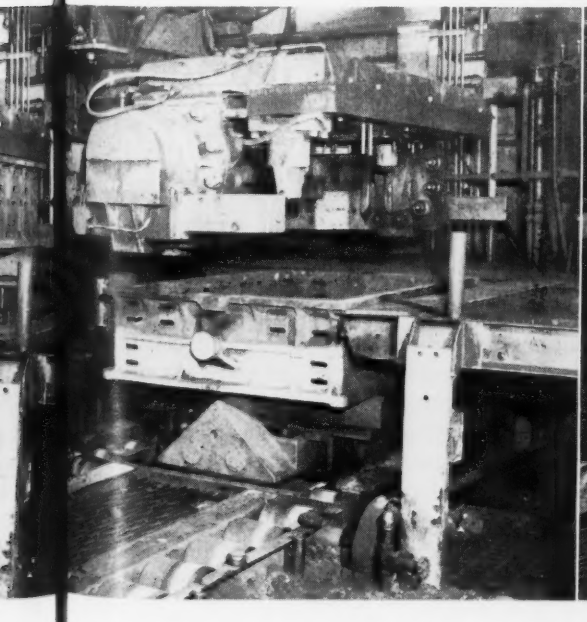


Fig. 11—Lowering the mold. Timed vibration of the pattern frees it from the sand as the mold descends

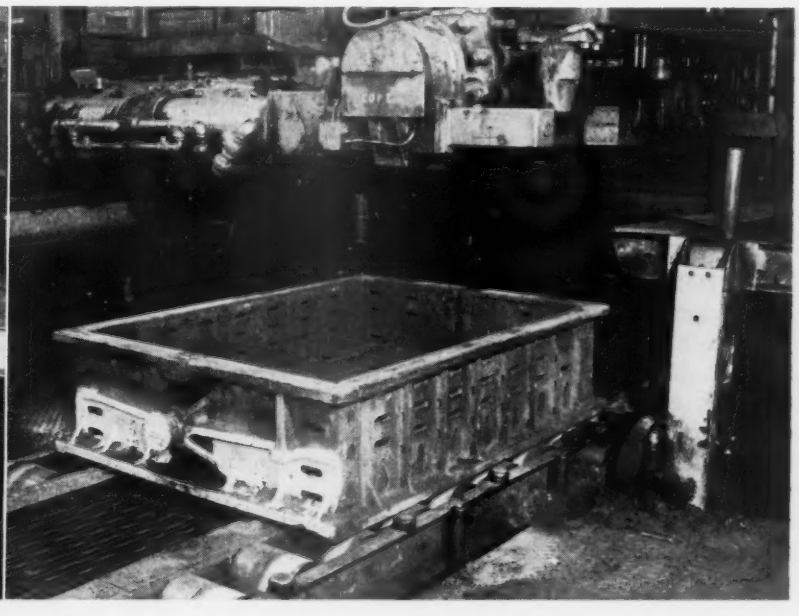


Fig. 12—Power roll conveyor, actuated by a limit switch, moves the finished mold from the machine

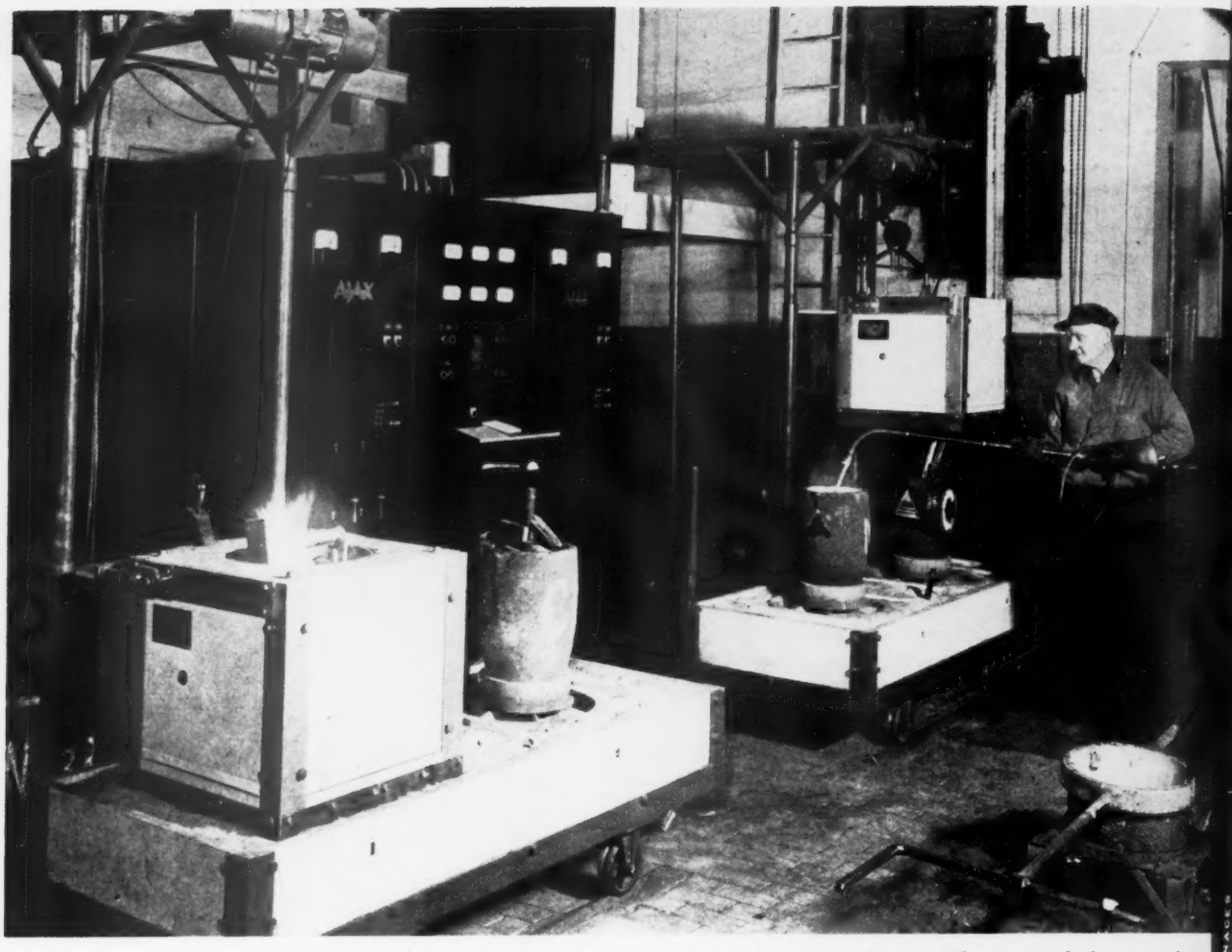


Fig. 1—The furnace in the foreground is melting down. The second furnace has just finished melting and is about to be lowered to start a new melting cycle

# INDUCTION MELTING

## In a Nonferrous Jobbing Foundry

By VAUGHAN C. REID
*Vice President*
City Pattern Foundry & Machine Co.
Detroit

IN THE fall of 1951, the foundry of City Pattern Foundry & Machine Co., Detroit, switched about two-thirds of its copper-base alloy melting capacity from pit-type, oil-fired furnaces to high-frequency induction equipment. Prior to this time, we had operated for some 30 years with oil-fired equipment.

As indicated in the first two lines of Table I, an important result of this change has been a 10 to 20 per cent improvement in certain physical properties of our castings. This improvement has been so marked and consistent that for one class of high-conductivity alloys, we have been able to increase our conductivity guarantee from 70 per cent to 80 per cent.

At the same time, our melting costs have been reduced. These savings are summarized in Table II. A study of these figures, and of the melting equipment and techniques behind them, offers an interesting demonstration of the adaptability of induction furnaces to certain types of nonferrous melting jobs.

The normal melting capacity of our foundry is from 6 to 8 tons per 8-hour day. The castings produced can be divided roughly into three groups:

1. Castings for the patterns produced by our pattern shop. These included master patterns for shell molding processes and other special casting methods, as well as for sand casting.

2. Castings of pure copper and high-conductivity alloys for welding equipment, arc-furnace electrode

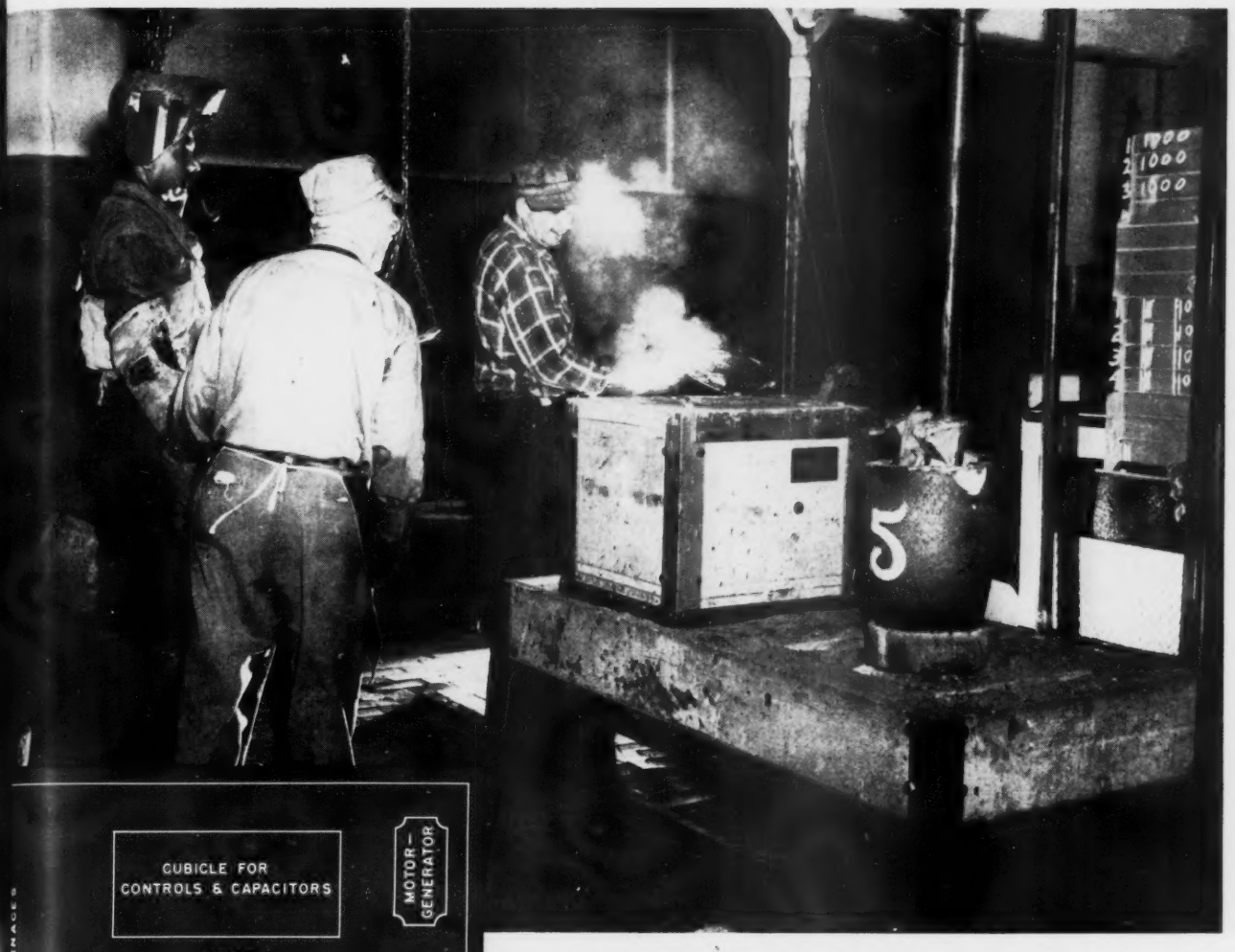


Fig. 2—View above shows the opposite end of the melting room. The melt-down is nearly completed in this furnace

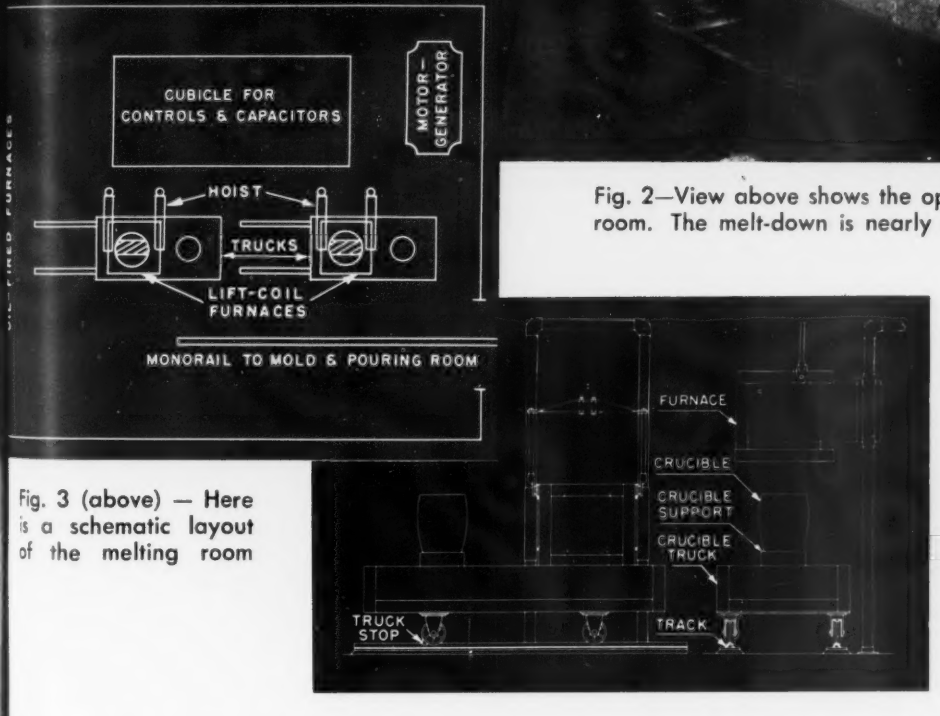



Fig. 3 (above) — Here is a schematic layout of the melting room




Fig. 4 (left) — A typical "lift-coil" melting station layout is represented in this schematic sketch

holders, and other electrical parts. These are produced on a contract basis for several outside firms.

3. Special castings of high-strength nonferrous alloys. These are also produced on a job basis for other companies.

Metals cast include aluminum, high-conductivity pure copper, Mallory alloys for electrical parts, and a wide variety of high-strength copper-base alloys. Table I lists typical compositions. Casting sizes range from a few ounces to 2400 lb in copper-base alloys, and 1600 lb in aluminum. The aluminum melting installation is separate from that described here, and will not be described further in this article.

Our original melting installation for copper-base alloys consisted of 15 oil-fired, pit type furnaces. Eight of these, using No. 70 crucibles, and two, using No. 90's were replaced with two Ajax-Northrup induction melting stations, each handling a No. 70 crucible. The entire induction installation, including furnaces, control panel, and motor-generator set, occupies roughly the same space as the ten furnaces which they replaced. Motor-generator output is 250 kw at 960 cycles.

Five large oil-fired furnaces, using No. 300 crucibles. were retained for use with the occasional large castings that we pour. The reason for this is basically

## TABLE 1—PHYSICAL PROPERTIES AND MELTING DATA FOR TYPICAL ALLOYS

| ALLOYS | Copper 99.9% Cu | | Mallory 3 97% Copper 3% Mall. 3 Hdner.* | | Mallory 53 B 97% Copper 3% Mall. 53 B Hdner.* | | Al Bronze 10-12% Al 3% Fe Bal. Copper | | Manganese Bronze No. 421 Ingot | | Red Brass 85-5-5-5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Properties | Induction Melting 90% | Oil-Fired Melting 80% | Induction Melting 80% | Oil-Fired Melting 70% | Induction Melting 55% | Oil-Fired Melting 45% | Induction Melting 12-15% | Oil-Fired Melting 12-15% | Induction Melting 12% | Oil-Fired Melting 12% | Induction Melting 18% | Oil-Fired Melting 15% |
| Conductivity | (minimum) | (minimum) | | | | | | | | | | |
| Elongation | 50% | 44% | 21% | 20% | 10% | 10% | 12% | 12% | 21% | 18-20% | 20% | 18-20% |
| Hardness $R_B$ | — | — | 70-75 $R_B$ | 70-75 $R_B$ | 90 $R_B$ | 90 $R_B$ | 85 $R_B$ | 85 $R_B$ | 70-75$R_B$ | 70$R_B$ | — | — |
| Melting time (200-lb charge) | 30 min | 70 min | 30 min | 90 min | 28 min | 75 min | 20 min | 45 min | 20 min | 45 min | 20 min | 45 min |
| Crucible life | 59 heats | 30 heats | 39 heats | 21 heats | 60 heats | 30 heats | 124 heats | 56 heats | 130 or over | 60 heats | 120 heats | 60 heats |
| Tensile strength | 30,000 | 30,000 | 55,000 | 50,000 | 85,000 | 85,000 | 92,000 | 75,000 | 60,000 | 55,000 | 32,000 | 28,000 |

*Hardener (master alloy)

economic. An induction installation capable of pouring 4000 pounds or so at one time would require much higher power than is needed for our normal melting. It would also give us a total melting capacity far in excess of our needs. The oil-fired units give us low-cost stand-by capacity for these larger castings, while we still have the advantages of induction melting on the majority of our melting at minimum cost.

Because of the wide variety of alloys handled at City Pattern, we selected the "lift-coil" type of induction melting equipment. This equipment, as indicated in Fig. 4, has the melting coil enclosed in a box-like shell that is lowered over the charged crucible for melting. The crucible is mounted on a small wheeled truck, with a pedestal for a similar crucible mounting on the other end of the truck. This second crucible is charged as the first one melts down. At the end of the melting period the coil is lifted away from hot crucible, and the truck moved to bring the second crucible under the coil, which is then lowered down to start another melting cycle. In this manner, practically continuous melting is achieved.

The induction installation at City Pattern has two of these truck-mounted melting set-ups, both powered by one 250-kw motor-generator set. This gives us two No. 70 crucibles in operation at all times, and an average capacity of ½-ton an hour.

At present, we are using two types of No. 70, clay-graphite crucibles. For pure copper and bronzes which do not contain high melting point alloying elements, we use a low-conductivity, type F crucible. Because of their low electrical conductivity, little heat is generated in the walls of these crucibles, resulting in relatively long crucible life. On aluminum bronzes, for instance, we get an average crucible life of 124 heats, compared to 56 heats in oil-fired furnaces.

When melting alloys which have patented hardening additives or other alloying elements which have high melting points and are difficult to dissolve, we find that cool crucibles are not satisfactory. The stirring action of the furnaces tended to throw these elements to the outside of the crucible, where they would adhere to the cooler walls and oxidize. This problem was eliminated by using a type K crucible, with higher conductivity, for these alloys.

Charges are made up of pure ingot stock, plus scrap made up of gates, heads, and risers. No machine shop scrap is used, because of the danger of contamination.

Charging procedures vary with the different alloys. In general, the bulk of the copper is charged first. Small pieces and light materials are placed at the bottom of the crucible, with the heavier pieces concentrated as tightly as possible in the center, and projecting above the top. A sawed-off portion of an old crucible, placed on top of the melting pot, serves as an inexpensive charging hopper.

As the charge melts down, the remainder of the copper is added. Special hardeners, and other high-melting-point, easily oxidized materials are added after the charge is melted, as described below.

Operation of the furnaces is extremely simple. Power is turned on as soon as the coil is lowered into position, and is adjusted to the varying conditions of the charge during melt-down by means of a rotary tap switch. At the same time, power factor is kept at or near unity by means of pushbutton-operated contactors on the control panel.

As shown in Table I, the average 200-lb charge melts down completely within 20 to 30 minutes. Special hardeners and any other high-melting point materials are added a few minutes after the melt-down is completed. During the last few minutes of the melt-

## TABLE II—COST SAVINGS

2/3 of Melting in Induction Furnaces, 1/3 in Oil-Fired, Compared with 100% Melting in Oil-Fired Furnaces

| | Amount Saved with Oil-Induction Combination |
|---|---|
| Item | Cents Per Pound |
| Fuel* | .484 |
| Labor | .08 |
| Fluxes, Deoxidizers | 1. |
| Crucibles | .116 |
| Total | 1.68 |

*Fuel oil @ $0.1155/gal, power @ $0.0126/kw-hr.

ing period, power to the melt is adjusted to keep the temperature 50 to 100 degrees above the desired temperature at the mold. This superheating compensates for any loss of temperature during pouring or while the crucible is being transported to the mold.

Calcium boride, lithium, and similar standard fluxes and deoxidizers are used, and are usually added two to five minutes before pouring. In general, the induction furnaces require about half as much of these materials as was formerly used. In some cases, including the aluminum and manganese bronzes, no flux whatsoever is required with the induction equipment.

All melts are poured directly from the melting crucibles into the molds. After the heating coil has been lifted, the crucible is picked up with a specially designed wheeled dolly (Fig. 5). As the dolly swings the crucible clear, the truck that serves as a melting platform is moved to bring the second, freshly charged crucible under the coil, which is lowered so that melting of the new charge starts immediately.

The melt is skimmed while still on the dolly, and then carried to the pouring room. Here it is trans-

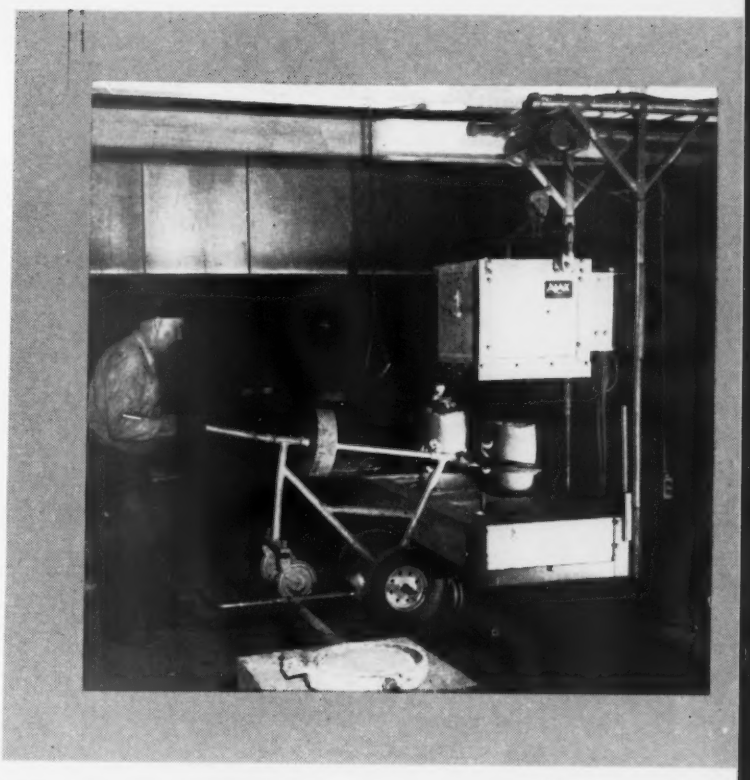
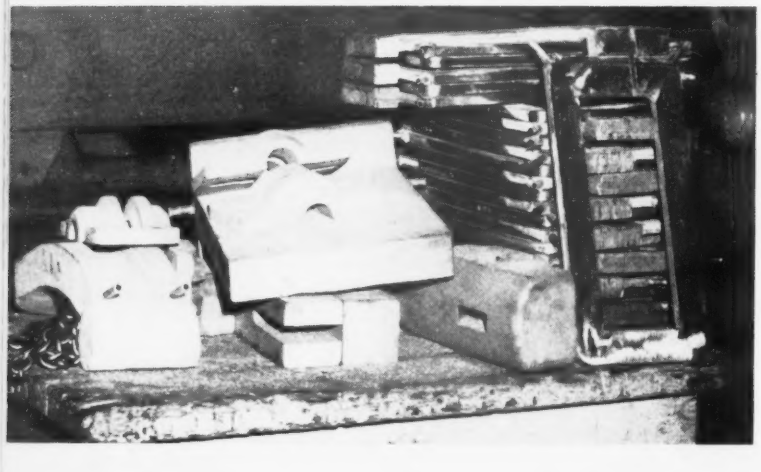


Fig. 5 (right)—A special dolly carries the crucible. Fig. 6 (below)—The crucible is skimmed on the dolly and then is carried to the pouring room

Fig. 7 (above)—The melt is transferred to a hand shank and carried by monorail to molds, most of which, like these, are poured on the mold floor

Fig. 8 (below)—The castings shown here are typical of those produced as described in this paper



ferred to a hand shank, which is carried by a monorail to the molds. Most castings are poured right on the mold floor (Fig. 7).

Test bars are cast from each heat, and checked for chemical analysis, Rockwell hardness, and tensile strength. With the oil-fired furnaces, we also make standard gas tests in sand molds, a practice that at first was followed with the induction furnaces as well. We soon learned, however, that gassy melts are a rarity in induction furnaces, and are easily detected by visual inspection of the melt. For this reason we have dispensed with the gas-test specimens.

This reduction in gas and porosity is an important factor in both the improved physical properties and the decreased costs which we have experienced with induction melting. For instance, we formerly lost at least one heat a week due to gassing up. With the new furnaces, we haven't lost one for the past 12 months. Percentage-wise, this adds up to an 18% reduction in the amount of scrap produced.

The savings in man-power are also important. With

the older furnaces, we had a melting room crew of eight men, and also had two men coming in for a full day of overtime every week to repair furnace linings. We now use two fewer men in the melting room, and lining repairs require only half a day's work by one man every three weeks. In addition, there are substantial reductions in daily overtime, as we now melt the same amount of metal in eight hours that we formerly turned out in ten.

In considering the advantages of induction melting for any particular nonferrous foundry operation, individual requirements must be carefully compared with the specific advantages of the equipment. The following list summarizes the requirements which made induction melting both economically and qualitatively successful for our foundry:

1. High quality requirements. This automatically eliminates many less expensive melting methods that are more than adequate for many types of work.
2. Expensive or easily oxidized alloying elements. If only low-cost or low-loss materials are melted, a large source of our savings would be eliminated.
3. Wide variety of alloys melted. This makes crucible-type equipment a necessity. However, where other requirements make induction furnaces desirable, the somewhat more efficient tilting type of furnace could be used for continuous production of similar alloys.
4. Less than full-time operation. Since our other savings are so large, reductions in start-up losses are not too important to us. In other one or two-shift foundries, however, induction melting's negligible start-up time could represent an important saving. Part-time operation also eliminates, of course, any equipment in which a molten heel of metal must be maintained during shut-down periods.

Less tangible but still important advantages of induction equipment are improved working conditions, small floor-space requirements, and general overall speed and flexibility. The relative importance of these factors, as well as those listed above, will usually determine the feasibility of induction melting for a given installation.

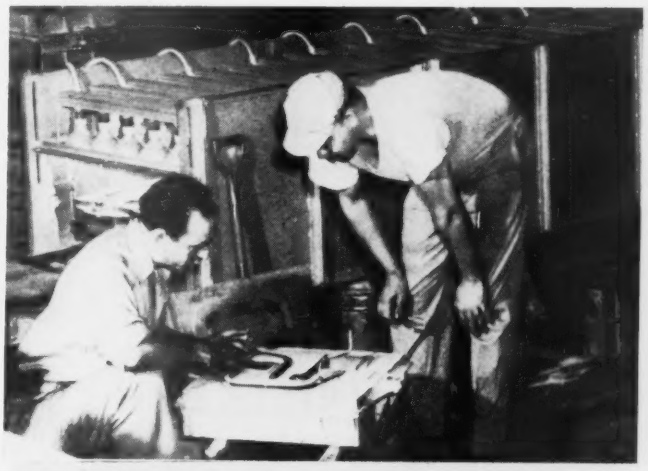


Fig. 9 (above)—Tubes through which cooling water can circulate are cast in place in many castings
Fig. 10 (below)—The men in this illustration are working on a sand mold for a typical large casting

## *Close Control Important in*

# Making Intricate Aluminum Castings

By ROBERT H. HERRMANN
*Associate Editor*
*FOUNDRY*

ALUMINUM castings for such diverse products as outboard motors, marine torpedoes, aircraft jet engines, range finders and diesel engines are produced daily at Acme Aluminum Alloys Inc., Dayton, O. Between 800,000 and 1 million lb of aluminum are poured each month to produce these varied castings. Green sand molds, permanent molds, molds completely composed of cores and even a few plaster molds are used to achieve sound, acceptable castings.

Because of the precise nature of many of the castings produced for the armed services, close control is maintained over all phases of production. In melting, for instance, no scrap is charged directly into the gas-fired, tilting crucible furnaces. Gating system metal and rejected castings are melted down in two 30,000-lb capacity reverberatory furnaces where each melt is realloyed through proper additions and analyses made in the company laboratory before the metal is cast into 27-lb ingots in a pig machine serving both furnaces.

Melts for the foundry consequently are made up either of these secondary metal ingots or of virgin ingots depending upon the need. Before castings are poured, a specimen of metal is taken from each heat and subjected to spectrographic analysis for alloy control. Test bars also are poured and identified by number for certification by inspectors and for plant records. These bars are used to determine tensile strength and other properties, as well as porosity. Each batch of metal is chlorinated at the furnace and in delivery ladles for elimination of gas. Naturally, close control is maintained over melting and pouring temperatures.

All castings produced for the armed services must pass x-ray inspection and close examination with gages and in targeting fixtures. Many of the castings must be pressure-tight; consequently they are subjected to hydrostatic or air pressure tests. Because of the stringent requirements of the specifications and the intricate nature of most of these parts, Acme utilizes every tool and technique available for producing the best possible castings. Inasmuch as proper gating and risering techniques are a necessity in turning out sound castings, Acme is applying the most recent developments in that field as reported by the American Foundrymen's Society through its work with Battelle Memorial Institute on fluid flow in molds.

Two of the larger castings currently in production are transmission casing halves for the Walker Bulldog tank. The finished, machined castings are shown in Fig. 13 with an assembled unit that is being gaged for accuracy. Each of the halves weighs about 245 lb as a cleaned casting, before machining.

Cope pattern for one of the halves is shown in Fig. 3, mounted on a pin-lift machine set in the foundry floor. A stationary sandslinger, Fig. 1, is used to ram the cope. When the cope has been rammed, a wire rope sling is looped over the handles on the cope flask and engaged by the hook of an overhead bridge crane. The finished cope is drawn off the pattern by four air-cylinder-actuated pins and lifted off the pins by the crane, Fig. 3, in readiness for placing on the drag on the roller conveyor in left background.

Drags are made on the rollover machine shown in Fig. 2. After the sandslinger has rammed them they are rolled over to the roller conveyor in the

right foreground, where cores are set. The completed cope then is moved over the drag from the pin-lift machine by bridge crane, and the mold is closed. Completed molds are pushed toward the end of the 50-ft-long roller conveyor, where they are poured. Poured molds are lifted from the conveyor by bridge crane and shaken out on the floor alongside the roller conveyor.

Some of the cores for this job are assembled in fixtures in the coreroom, as shown in Fig. 5, and transferred on pallets by lift truck to the molding floor, from which they are lifted by crane and placed in the mold (Fig. 4). In addition to the core assembly, each mold contains a number of loose cores.

Fig. 12 shows the rear half of the tank transmission housing as it leaves the foundry ready for machining. Before shipment, however, each of these castings is gaged, targeted, x-rayed and subjected to an underwater pressure test with air at 100 psi. Unless all its dimensions are correct within $\pm 1/32$-in., a casting is rejected. The targeting fixture for one-half of the housing shown in Fig. 6 checks several points on the casting simultaneously.

The casting shown in Fig. 8 is a component part of a computer for range finder, one of 135 castings made for that unit. Each is gaged and targeted in a

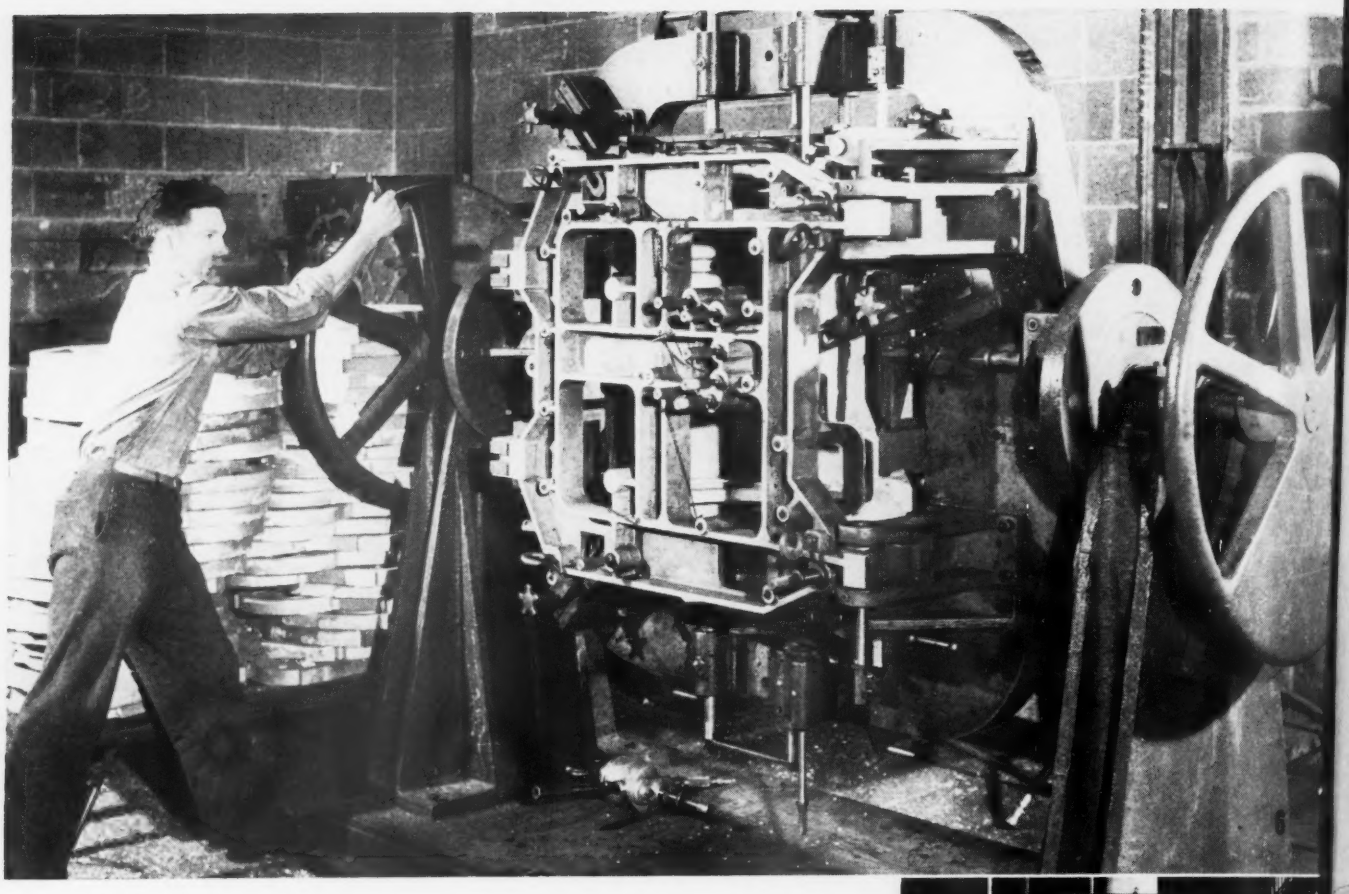
Fig. 1—Cope for half a Walker Bulldog tank transmission casing is rammed by sandslinger

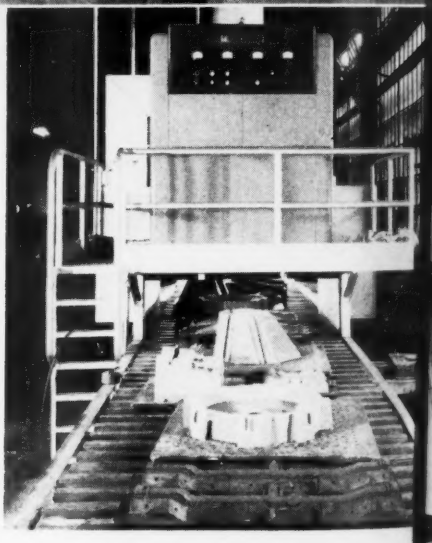
Fig. 2—Same sandslinger is used to ram the drag on a rollover machine. Molds are closed on the roller conveyor in right foreground

Fig. 3—Completed cope is drawn off pattern by pneumatic pins. A crane lifts it off pins for placement on drag on the roller conveyor

Fig. 4—Cores held by fixture are lowered to drag by the crane. Loose cores also are set

Fig. 5—Assembly of cores into the fixtures is done in the core department. Lift trucks deliver finished assemblies to molding floor





room set aside solely for that purpose.

The green sand mold for the casting pictured is made in a jolt rollover machine and contains 19 individually set cores. Before these cores leave the coreroom, they are definned and fitted into a duplicate plaster mold to make sure that there are no delays in the already time-consuming core setting operation on the molding floor. After fitting, the complete set of cores is placed on a tote board and delivered, four or five at a time, to the molding floor.

Section thicknesses of the casting range from $\frac{1}{8}$ to $\frac{3}{4}$-in., and specifications require $\pm 1/32$-in. at 27 points in a targeting fixture. In addition, 12 points are snap gage checked to $\pm 1/32$-in. and 23 points to 0.015-in. Each casting is x-ray inspected.

Another unusual job in production at the plant is a compressor frame rear for the J-47 Sabre jet engine. The cleaned casting weighs 192 lb, and specifications require that the weight be held within a 1 per cent range. Dimensional tolerances as checked in a targeting fixture are within $\pm 1/32$-in.

The casting is poured in an all-core mold, one of which is shown being assembled in Fig. 9. The base core is 50 in. in diam., and the completed mold contains 55 cores pasted together, with a series of metal plates interconnected with support wire around the circumference of the mold assembly to give it support during pouring. The molds are assembled on metal bottom boards resting on metal skids in an area alongside and beyond the discharge end of the dielectric core oven shown in Fig. 7. The large base core and others in the assembly are baked in this oven.

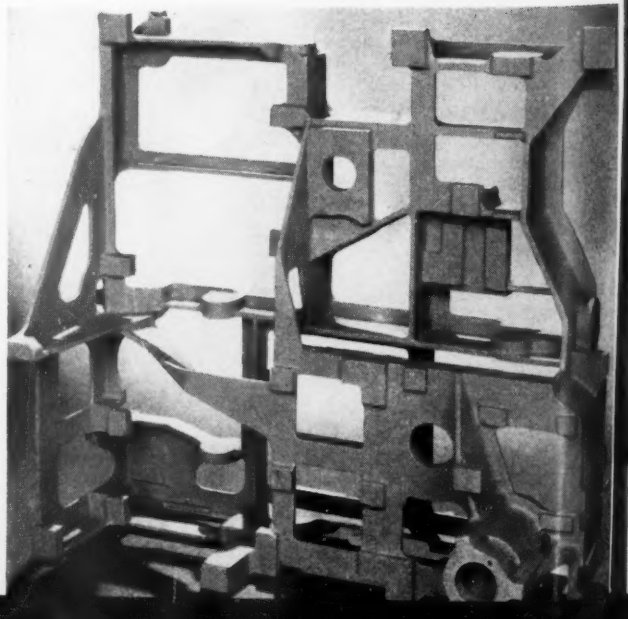


Fig. 6—Half of a tank transmission casing is gaged in this large targeting fixture

Fig. 7—Entry end of dielectric core drier

Fig. 8—Part for a range finder computer. The green sand mold for it needs 19 cores

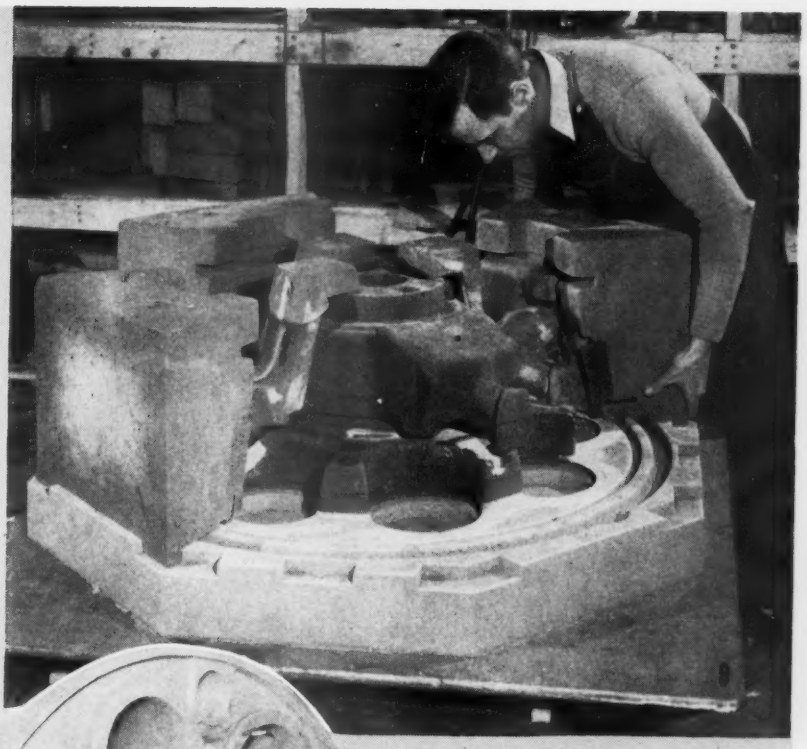
Fig. 9—All-core mold is being assembled for a jet engine compressor frame casting

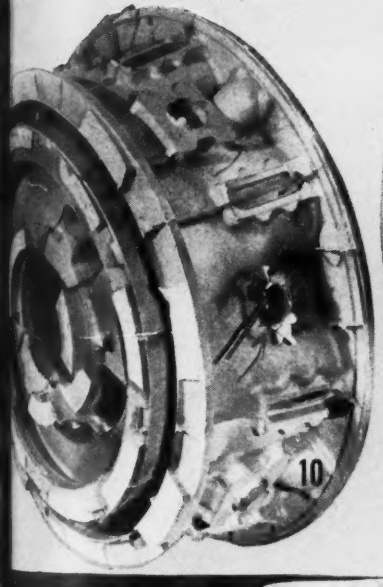
Fig. 10—The J-47 jet engine part as cast

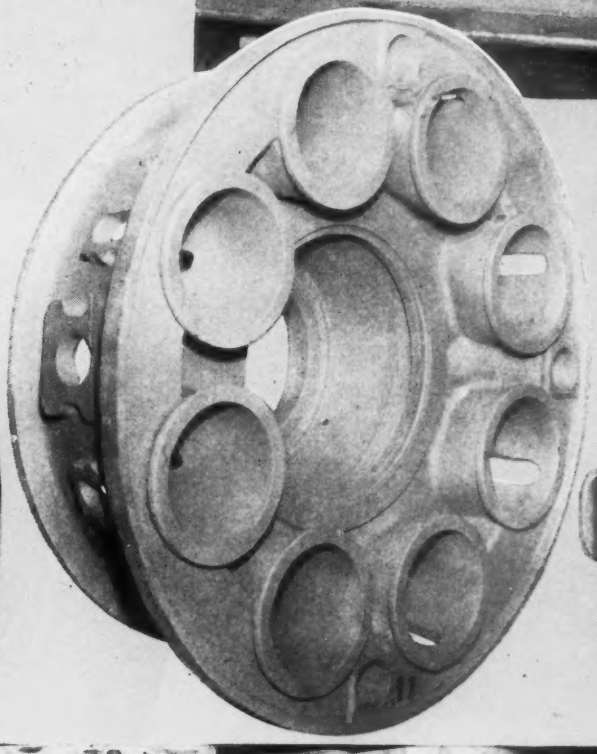
Fig. 11—Cleaned J-47 jet engine casting

Fig. 12—Half of the Walker tank transmission casing as it leaves the foundry

Fig. 13—Two halves and assembled casing for the Walker Bulldog tank transmission







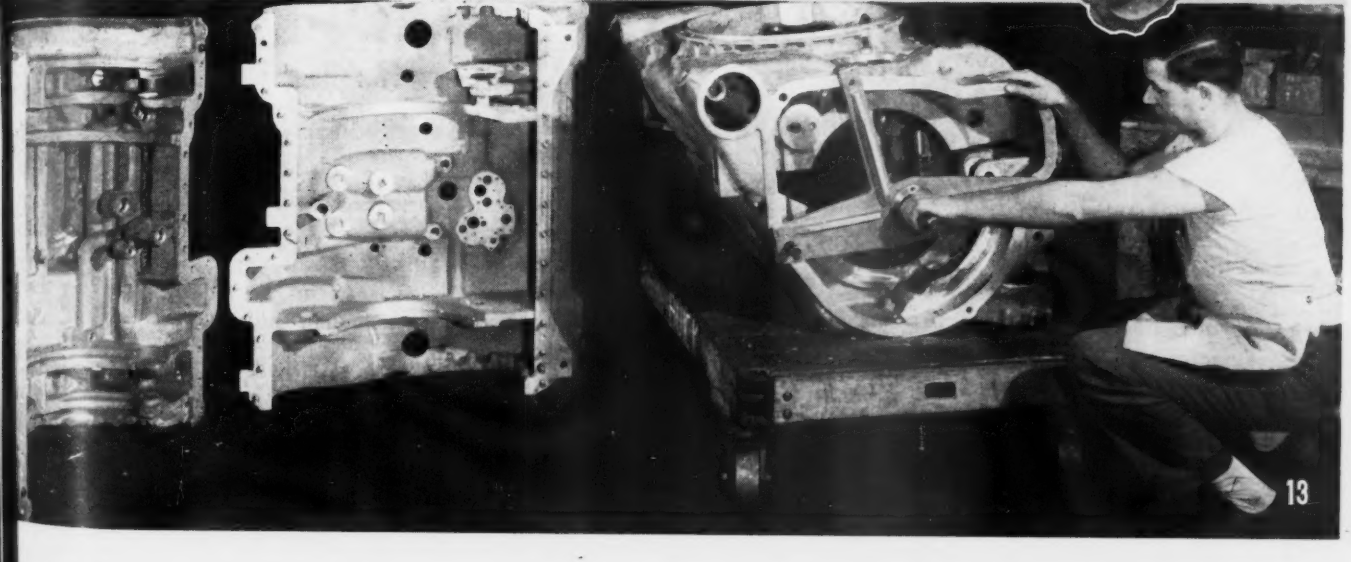


Fig. 14—Cope for another ordnance casting, produced on rollover machine, has been lowered to a roller conveyor ready to be placed on drag shown being cored in Fig. 15

During stages of assembly, the paste must be dried on cores which have been placed in position. For that purpose a heater box containing a ring of infrared bulbs is placed by bridge crane over the partially assembled mold. The bottom edge of the box rests on the bottom board. When the paste has dried thoroughly, the box is moved to another freshly pasted mold, and assembly of the dried mold is completed.

Molds are transported by fork lift truck to the pouring area, adjacent to the holding furnaces. When they have been poured, they again are moved by truck to the shakeout area and placed on the floor, where supporting metal plates and wires are removed and returned to the mold assembly area. Bridge cranes are employed to lift the poured molds to the vibrating shakeout. The rough casting is shown with gates and risers removed in Fig. 10 and the cleaned casting in Fig. 11.

Figs. 14 and 15 are views of mold sections for another ordnance casting. In Fig. 14 the cope has been lowered to the roller conveyor by the rollover machine, and the pattern is being returned in readiness for ramming up another cope. Cores are set in the drag as shown in Fig. 15. A closed mold is shown in the background. Fork lift trucks are employed to move the mold to the pouring area.

The coreroom is located on the ground floor adjacent to the molding area. It is equipped with a 550-lb batch muller, benches for hand work, core blowers and a number of jolt rollover draw machines. Cores are baked in two tower ovens, eight rack ovens and the new dielectric oven shown in Fig. 7. This straight-through type oven, one of the largest of its kind in the country, has an opening in the heating zone 5 ft wide and 18 in. high. Average time for drying a core is 30 minutes, from placement of core on the conveyor at the entry end to removal of the dried core at the discharge end.

Many of the castings are poured in aluminum alloys containing magnesium. To avoid reaction of

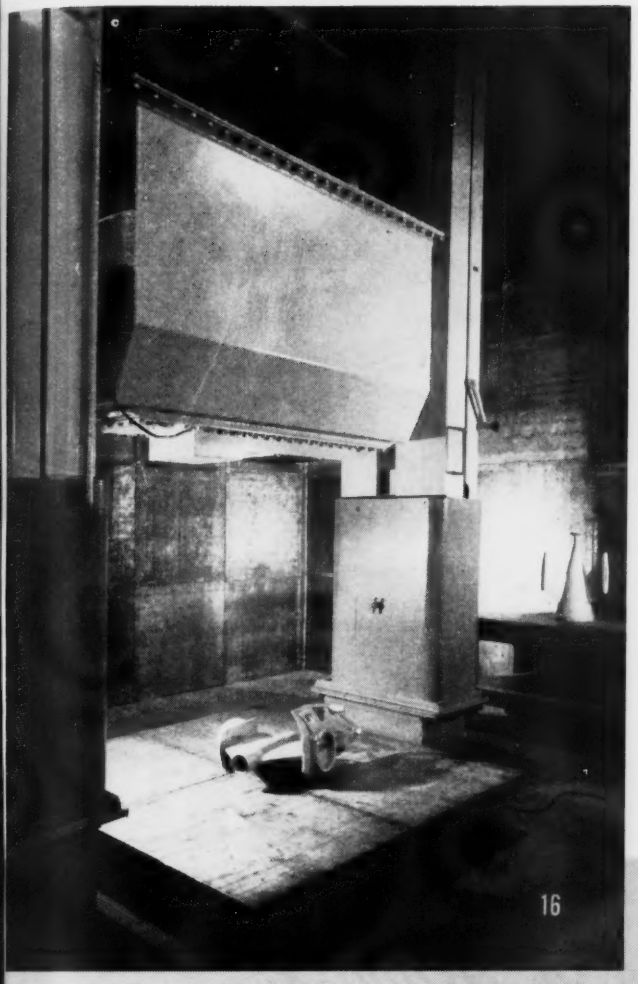


Fig. 16—Air Force part is inspected by x-ray

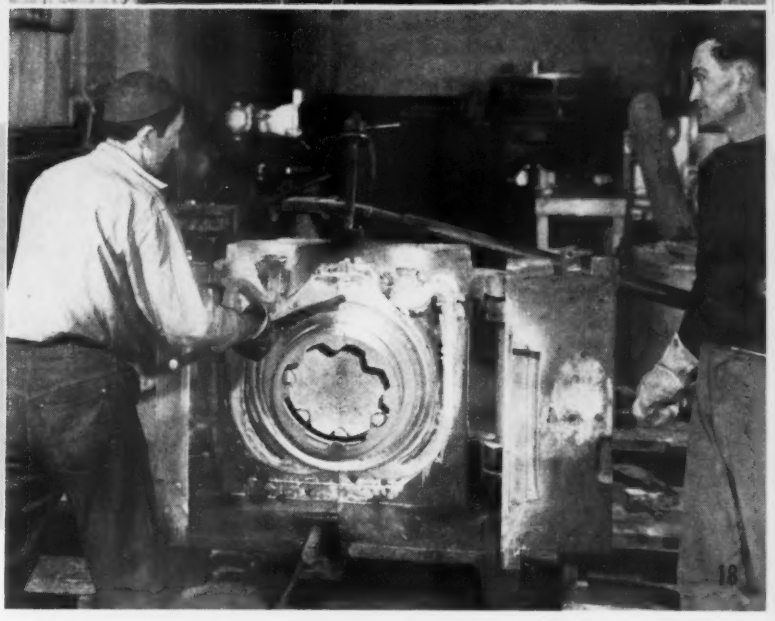


Fig. 17—An end bell for a railroad diesel engine is being poured in a permanent mold. Removal of casting from mold is illustrated in Fig. 18

these Al-Mg type alloys with sand, inhibitors are used with the molding and core sand. To differentiate between various core sand mixes and between similarly shaped cores, some cores are dyed.

The main melting room is equipped with seventeen 1000-lb, gas-fired tilting crucible furnaces. On the other side of the melting room wall in the molding area are six 300-lb, gas-fired holding furnaces. Metal is tapped at 1400° F into bull ladles carried on dollies which are pushed manually to pouring stations.

Along the wall of the molding room opposite the furnaces are 18 jolt-squeeze molding machines for producing some of the smaller work in flasks laid out on the floor for pouring. A movable sandslinger operates from a set of tracks in the center of the molding room. It is used to ram up some of the larger floor work. A larger stationary slinger, previously described, is located at the end of the room.

An extensive wood and metal pattern shop is located on the second floor. A section housing a plaster molding department is walled off from the main area. There the company makes its own matchplates and also turns out a few castings for customers when the type of job calls for use of the plaster process. Laboratories and gaging and targeting rooms also are located on this floor, along with the 220,000-v x-ray machine. The larger, 440,000-v machine shown in Fig. 16 is on the main floor.

A small, permanent mold department is located in a separate building with the reverberatory alloying furnaces. Figs. 17 and 18 show the pouring and removal of an end bell for a railroad diesel engine from one of the permanent mold machines. Metal is melted in two 300-lb electric furnaces, where it is held at 1300° F 24 hr a day. The department also has two 300-lb, gas fired crucible furnaces.

***Presidents of the Society—***

CHESTER K. FAUNT

ROY M. JACOBS

EDWIN W. HORLEBEIN

WILLIAM A. GLUNTZ

# NON-FERROUS FOUNDERS' SO

## *Celebrates 10 years of service*

By JAMES W. WOLFE
*Executive Secretary*
Non-Ferrous Founders' Society

THE Non-Ferrous Founders' Society, now celebrating 10 years of service to that industry, was organized on a national basis on Apr. 28, 1943 at a meeting in St. Louis.

The real beginning of the society took place in Chicago during the latter part of 1941 and early in 1942 when a group of foundrymen from that area sensed the need for such a national organization. After the issuance of manufacturing and metal controls by the government in early 1942, various nonferrous foundry groups, especially those in Boston, Philadelphia and New York, worked with the Chicago group in drawing up plans for national co-operation within the nonferrous castings industry.

During this organizational period, much credit is due to individuals who gave their time and unselfish effort. Among these were: Thomas H. Addie, American Manganese Bronze Co., Philadelphia; Justin A. Duncan, William Duncan Co., East Boston, Mass.; Oscar Swangren, Dorchester Brass & Aluminum Foundry Inc., Hyde Park, Mass.; Edwin W. Horlebein, Gibson & Kirk Co., Baltimore; Charles H. Stokesbury, Derby Castings Co., Seymour, Conn.; William Paulson, Thos. Paulson & Son Inc., Brooklyn, N. Y.; Thomas S. Hemenway, Metal & Alloy Specialties Co., Buffalo; L. M. Nesselbush, Falcon Bronze Co., Youngstown, O.; A. M. Cadman, A. W. Cadman Mfg. Co., Pittsburgh; George Hazen, Brass Foundry Co., Peoria, Ill.; James Gilbert, Gilbert Brass Foundry Co., St. Louis; Roy M. Jacobs, Standard Brass Works, Milwaukee; William Goldsmith, C. A. Goldsmith Co., Newark, N. J.; Chester K. Faunt, Christensen & Olsen Foundry Co., Chicago; and Fred Haack Jr., Capital Brass & Aluminum Foundry Co., Chicago.

Two other men, then outside of the nonferrous foundry industry, rendered invaluable assistance during the early stages of the organization. C. E. Westover, then executive vice president, American Foundrymen's Society, not only arranged for meetings during AFS conventions, but also furnished a secretary at no cost. Frank G. Steinebach, editor of FOUNDRY, editorially and in a personal way gave the organization a needed boost.

After the issuance of Revised Maximum Price Regulation No. 125 on Jan. 27, 1943, which not only froze casting prices but, in many cases, required a base price of Oct. 15, 1941 and repayments to customers, plans for a national organization were accelerated.

FRED HAACK JR.

WALTER M. CLARK

J. D. ZAISER

L. H. DURDIN

# S' SOCIETY

JAMES W. WOLFE

On April 28, 1943, representatives of 66 foundries organized the society as it exists today.

Committees began to function immediately. Thomas H. Addie became chairman of the Washington Contacts Committee and Edwin W. Horlebein spearheaded the activities of the OPA committee.

L. M. Nesselbush was appointed chairman of a committee to prepare a basic cost manual, and the first edition was printed and distributed in 1945. That committee became a standing committee and, under the chairmanship of William A. Gluntz, an expanded cost system was released in 1947. Mr. Gluntz and his committee now are preparing a new edition for small, medium and large foundries.

The Trade Practices Committee, under the chairmanship of Charles H. Stokesbury, began the formulation of Terms and Conditions of Sales. Due to these early efforts, and the subsequent endeavors of members of this committee, an agreement on trade practices was culminated in December, 1952 with the National Association of Purchasing Agents. (FOUNDRY, February, 1953, page 222)

Membership in the society has increased steadily until today it embodies nearly all the progressive and forward-thinking companies in the industry. Old animosities between foundries are disappearing in the friendships and co-operative spirit of mutual understanding. Here the society has accomplished much in intercompany human relations.

The first purpose of the society is to provide a liaison between the nonferrous casting industry and the government and to make the industry's facilities available in time of emergency. Soon after the end of World War II, the society was one of the first to establish liaison committees within the Munitions Board in brass and bronze, aluminum and technical problems.

The bitter experiences of World War II were helpful in industry's planning in material and price controls incident to Korea. The Executive Committee of the society became the Washington Contacts Committee. Through the efforts of this group, certain necessary changes in M-12—Copper, M-22—Copper Raw Materials and M-22—Alu- (*Please turn to page* 238)

# QUESTIONS

**All pertinent data given on pattern card system . . . . .**

**Brass bushing cores . . . . . Encounters difficulty**

**Experimental work required to establish results . . . . .**

## Simplifies Pattern Storage

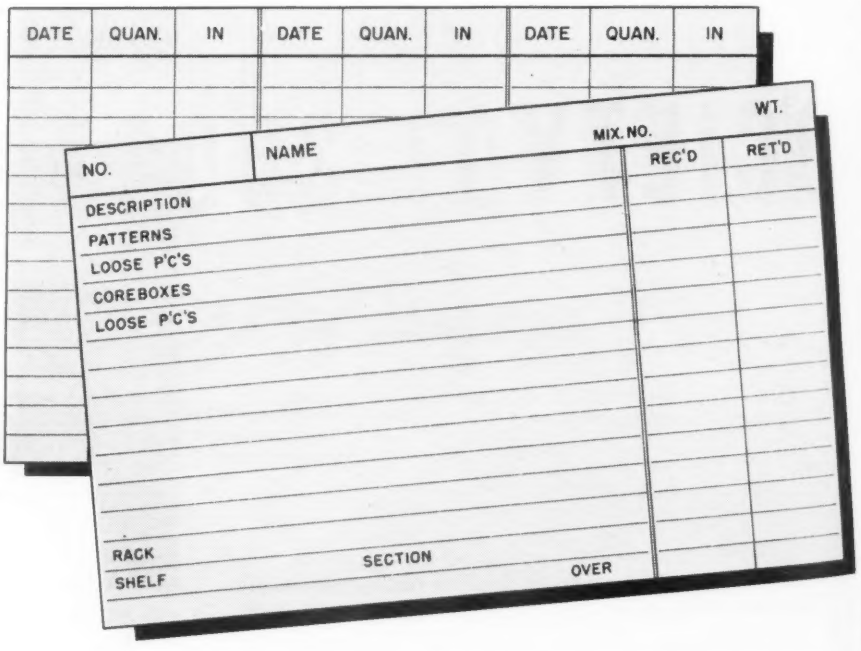
**QUESTION** We shall appreciate information that will enable us to set up an index card system in connection with our pattern storage.

**ANSWER** On several occasions FOUNDRY has presented descriptions of methods adopted in various plants for keeping a record of patterns. The methods vary to some extent depending on the size of the plant, the number of patterns involved, and on whether the patterns are made on the premises, or are supplied by the customers. The 3 x 5-in. card shown in the accompanying illustration is used at an eastern foundry to give complete information about the pattern or patterns of any customer. Under this system it is claimed that no pattern can be lost. Also it supplies a complete history of the castings made in a convenient form for ready reference.

A new pattern is assigned a shop number written in the upper left corner. The card is filed under this system of numbers which runs consecutively. Name of the customer, weight of the casting and metal mixture are entered in columns provided for the purpose. The type of casting is listed in the *Description* column. Pattern material—wood, brass, white metal etc.—and whether loose pattern or matchplate, are entered in the *Patterns* column. Other lines are provided for particulars of loose pieces, number of coreboxes and other related information.

The pattern storage department contains a series of shelves divided into sections and numbered. Space for information covering the rack, the shelf and the particular section of the shelf, is provided near the bottom of the card. Two columns at the right end of the card are reserved for dates on which the pattern either entered or left the foundry. When the pattern is received at the foundry the date is entered in the first column. When, for any reason, changes, repairs, etc. occur, pattern is taken away by the customer, the date is entered in the second, or outside column. When an inquiry is made, the foundryman at a glance can tell whether the pattern is in his or in his customer's possession.

Three sections, each divided into three columns on the other side of the card are headed *Date, Quantity* and *In*. When castings are made from a given pattern, the date and the quantity are marked in the respective columns. When the pattern is restored to the pattern storage a check mark is placed in the column marked *In* to indicate the order has been filled. A glance at the card shows the location of the pattern. A check mark following the latest entry in the *Date* and *Quantity* line indicates the pattern is in the storage. Absence of a check mark shows that the pattern is in the foundry.




*Below*—Information on the pattern and its location are shown on the front of the card. *Above*—The reverse side shows the date used, quantity of castings made, and whether or not the order has been filled

## Core Mix for Brass Bushings

**QUESTION** We will appreciate your suggestions on a core mixture for brass bushings weighing from 5 to 15 lb. Alloy is 85-5-5-5.

**ANSWER** A variety of core mixtures are used by different foundries with success in producing brass or bronze bushings, and each considers its mix to be the best. Dietert in his book *Foundry Core Practice*, for example, shows three different mixtures which are being used. One is composed of 120 qt core sand, 2 qt cereal binder and 4 qt resin (pine). Another is

# ANSWERS

made of 30 qt molding sand, 90 qt core sand, and 5 to 6 qt resin. The third is made of 4 parts by weight of molding sand, 14 parts core sand and 1 part cereal binder.

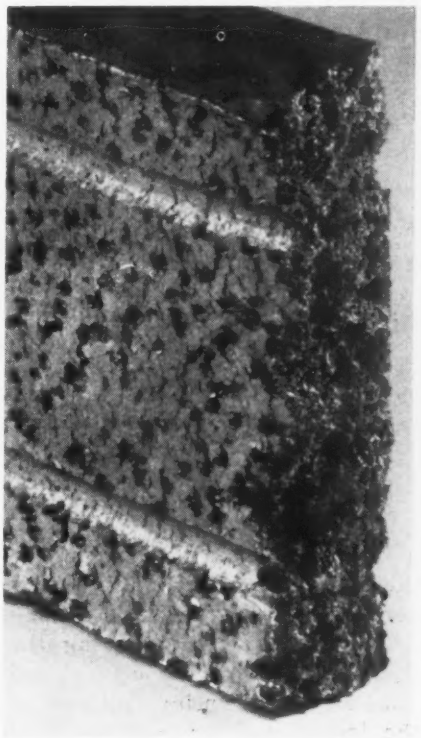
We believe that one containing 80 parts by weight of core sand, 1 part core oil and 2 parts cereal binder should serve. It also might be pointed out that many foundries are using core sands bonded with synthetic resins such as phenol and urea formaldehyde. Since the properties of these materials vary to some degree, it is best to obtain information on suitable formulas from the manufacturers.

## Defect Due to Several Causes

**QUESTION** We have been having difficulty with an 88-10-2 bronze. When poured in our regular green-sand molds the castings turn out fine, but when making bushing stock where a dry-sand center core is used, the interior face is permeated with holes as you can see from the accompanying specimen. This condition does not exist when we add a small percentage of zinc. However, we do not want to use zinc in the alloy since some of the bushings are employed where they come into contact with paper mill acids. We also have tried different pouring temperatures and core washes without success.

**ANSWER** In our opinion your difficulty arises from a combination of causes rather than one, and these are quite apparent by the structure exhibited on fracturing. To the naked eye the fracture is somewhat feathery with numerous multicolored patches from tan to yellowish with a few grayish areas. Under a low-power magnifying glass the patchy areas are rough-surfaced holes showing the dendritic or pine tree-like structure. To us this is an indication of shrinkage resulting from lack of feeding.

The fracture also shows some small holes which appear to be the result of gassy metal, and your reference to use of a small amount of zinc giving better results bears that out since zinc, volatilizing at 1760° F, acts as a degasifier. Finally, there is a possibility that the pouring may be on the high side although you mention trying different temperatures without any improvement. This alloy (88-10-2), commonly called gun metal, is reputed to be quite sensitive to temperature, and indications are that



Appearance of machined face and fractured section indicates that defect results from combination of causes rather than one

it should be poured around 2140°F.

You do not mention how this bushing is gated, but our suggestion is to employ top or pop gates; pouring in the vertical position. Make the pattern about 1 in. longer than the desired finish length to act as a feeder head. Use a ring basin containing four ¼-in. diam holes spaced equidistantly, and midway between the sides of the mold cavity.

## Increasing Tensile Strength

**QUESTION** We are attempting to raise the tensile strength of our gray iron above 30,000 psi. At present we are using a 2000-lb charge composed of 300 lb northern pig (3.00 per cent Si), 500 lb southern pig (2.90 per cent Si), 600 lb return gates (2.35 per cent Si), and 600 lb foreign scrap (unknown Si). Tensile strength of the mix is approximately 23,000 psi. We have run charges containing 900 lb northern pig (3.00 per cent Si), 500 lb steel rails, 400 lb return gates (1.90 per cent Si), and 200 lb foreign scrap (unknown Si) which showed a tensile strength of about 24,500 psi. Using ladle inoculation on that mix of 1 per cent of an alloy containing 30 per cent Si and 50 per cent Cr, the tensile strength was increased to around 28,380 psi. We need the 30,000 psi or better for only a few jobs, and cannot run a complete heat since most of our castings are light section requiring high machinability. What can we do by ladle additions to increase the tensile strength to 30,000 psi or more?

**ANSWER** Trying to increase the tensile strength 30 per cent in one case and 22 per cent in the other is somewhat speculative, to say the least, as you already have found out. If the alloy added to the 24,500 psi iron would function as effectively with increased amounts, then it would appear that the addition of 1½ per cent instead of 1 per cent would bring the tensile strength slightly over 30,000 psi. By the same token, the addition of 2 per cent of the alloy to the 23,000 psi iron should raise its tensile strength to a little over 30,000 psi.

You do not mention whether machinability also is a factor in the higher strength irons, but if that is so, there is the possibility of running into trouble by increasing the amount of chromium in the iron to bring up the strength to the desired point. The only way you can

# QUESTIONS ? ANSWERS

determine that point is to try the indicated amounts of the chromium-bearing alloy to see whether they turn the trick on tensile strength, and how machinability is affected.

If machinability is decreased too much, then you will have to turn to another alloy, such as molybdenum, to provide the increase in strength. For example, you could try in the case of the 23,000-psi iron 1 per cent of the Si-Cr alloy with 0.4 per cent Mo (11 oz ferromolybdenum per 100 lb iron), and 1 per cent of the Si-Cr alloy with 0.25 per cent Mo (6¾ oz of ferromolybdenum per 100 lb iron) for the 24,500-psi iron.

Here again you will have to do a little experimental work to determine the effect of the alloy additions on tensile strength and machinability, and then make adjustments up or down in the quantities used until you strike the happy medium in relation to physical properties as well as cost.

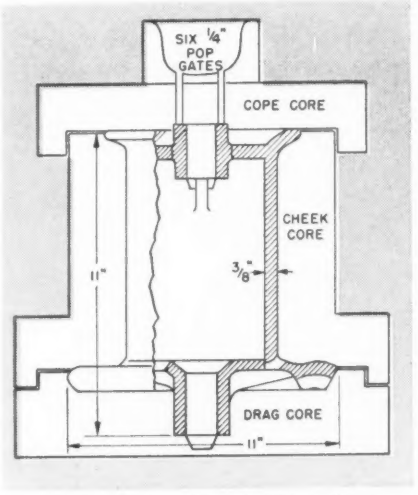
It might be pointed out that it will be well worth your while to perform a little analytical work on your foreign scrap to ascertain the compositions of the various types on hand. With that knowledge you will be able to do a much better job in making up your charges to obtain uniform and consistent properties in the iron over the spout.

## Make Winch Drums in Cores

**QUESTION** We are preparing to supply a considerable number of small gray iron winch drum castings, approximate weight 40 lb each. We shall appreciate your opinion on the best type of pattern and molding technique. Flange at one end carries a row of teeth as shown at the lower right in the accompanying illustration.

**ANSWER** Without additional information, flask equipment on hand or available, number of castings on order or in prospect, relative skill of employees, and several other variable factors, it is impossible to specify any one of several alternative methods as the best method for making the small winch drum castings. The best in this instance means the safest and cheapest and most reliable.

Assuming that you are starting from scratch and that at least several hundred castings are required, we suggest a built up core mold as the most satisfactory answer to pour problem. General features are shown in the accompanying illustration. One core for the drag. One core for the cheek. One core for the cope and one core for the inside. The cheek core may be split horizontally or vertically. Small cylindrical cores for forming the shaft openings in the central end hubs may form an integral part of the inside core, or may be made separately and dropped into place. A shoulder on the drag core, and a similar shoulder on the cope core will serve as guides and locks when the group of cores is assembled.




Freehand sketch indicating how group of dry sand cores may be assembled to form mold for drum

The assemblies may be clamped or weighted, or they may be set up inside a long flask or other type of curbing, where sand may be rammed around them, to hold them in place, and prevent metal from leaking. A suggested gating system is a pouring basin on the top of the cope with half a dozen ¼-in. pop gates leading into the top of the short hub. If necessary, the job could be handled by comparatively unskilled men. Also, with ample oven capacity the job could be assigned to two, three, or four men, one corebox to each man, with resulting large output.

## Recover Iron in Cupola Drop

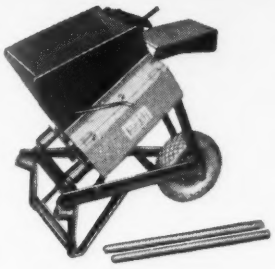
**QUESTION** Please advise us if there is any detailed information covering the removal of shot and splash iron from the cupola drop; also if it is considered good practice if there is from 300 to 500 lb of this iron from ⅛ to ¾-in. and up. We know most of this material comes from partly melted, softened stock, and when the cupola bottom is not constructed so as to give a complete drain. We shut off the blast as soon as we have sufficient metal for the cast, and try to have one-half to a full charge drop at the end of the heat. Is that considered good practice? We have a stationary receiving ladle and stop the cupola when the slag starts to flow. By draining all the slag and metal we would have a little less fine iron. We have a bridge or overhang of 3 to 8 in.; sometimes more, and in this we find considerable metal. We have been running the drop, less the larger coke, and chipped out bridge material through a tumbling mill, but no longer need that mill due to a change in castings cleaning methods. Are we justified in keeping the mill just for the drop? Foundry friends close by tell us that they pick out what they see, and after the drop is on the dump they pick out some shown up by rusting. Also they told us not to spend 50c to save a nickel.

**ANSWER** It always is advisable to have approximately one solid charge of metal remaining in the drop to avoid oxidation of the last metal melted. Additionally it is suggested that, as the cupola is burning down at the end of the heat, the wind rate be dropped gradually. This prevents lowering of the bed excessively during the period of decreasing stock resistance.

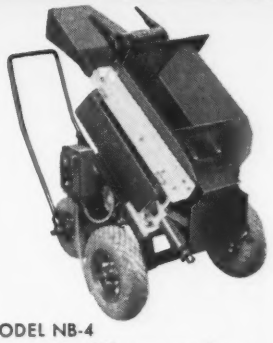
Concerning the shot and fine iron in the drop it is suggested that a separate drain hole be installed as close to the taphole runner as practical, and the remaining iron and slag tapped out through it. If the floor is sand, a temporary pig bed can be made. Slag will float on top and can be broken off on freezing. Drain hole can be built similar to the special parts used for torches on light-up. It should be construct-

(*Concluded on page* 120)

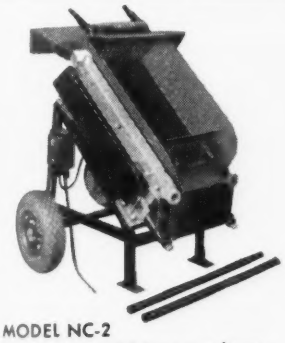
# TO MEET YOUR REQUIREMENTS FOR CONDITIONED SAND *Economically...*



THE ROYER JUNIOR
4 to 7 tons per hour

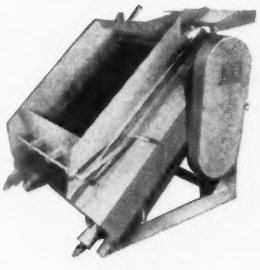


MODEL NB-4
7 to 9½ tons per hour

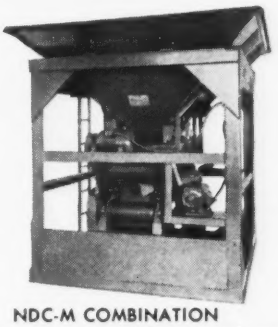


MODEL NC-2
12 to 15 tons per hour

MODEL NDP
20 to 25 tons per hour



MODEL NYS
60 to 100 tons per hour



NDC-M COMBINATION
20 to 25 tons per hour

. . . use Royer Sand Preparation equipment. Whatever your capacity needs may be, a Royer or combination of Royers can supply the demand, quickly and economically. From 4 to 100 tons of molding sand per hour, depending on the model, can be prepared at one-half the cost of manual conditioning. This operating economy is only part of the savings you make. Because of the proper conditioning of your molding sand you will have fewer rejects due to blows and run-outs and the smoother surfaces will reduce cleaning and grinding time.

All models from the small Junior (4 to 7 tons per hour) to the NYS (60 to 100 tons) give you the six point conditioning—thorough refuse removal; positive lump breaking; complete blending and mixing; even distribution of moisture; increased permeability; double aeration. The finished product is an open, velvety textured sand—ready for the molder's use.

More than 8000 Royers are in use today in foundries everywhere—large and small—jobbing or production—preparing properly conditioned sand for true-to-pattern molding.

Investigate the possibilities for these cost-cutting machines in your plant. Our Bulletin 744, sent on request, gives complete information on sizes and models available.

*Foremost in Sand* ROYER *Conditioning Equipment*

**ROYER FOUNDRY & MACHINE CO.** 159 PRINGLE ST. KINGSTON, PA.

# QUESTIONS ? ANSWERS

(*Concluded from page* 118)

ed of materials easily pushed into the well and sealed over on the outside shell with a bolted plate. Flow is regulated by the size of the hole and a "bot" on the end of a long rod. It is very desirable to remove all iron and slag before dropping bottoms to avoid accidents from splashing hot material and to make clean-up easier.

Arrangement suggested will avoid both a nasty clean-up if drained through the ladle, and also the fine material now produced in the drop. We agree that recovery of that fine material is too costly. Accumulation of metal in the "bridge" can be eliminated by preventing its formation; it originates from small coke and insufficient bosh in the cupola.

We do not know the size of the cupola but, in any event, screen the coke over a fork with every other tine broken out. Thickness of bosh is determined by the cupola diameter and usually is 3 in. for 42 to 48-in. units, 4 in. for 54 to 60-in., and 6 in. for 72-in. cupolas. Bosh is constructed by extending the lining out into the cupola starting at the tops of the tuyeres and continuing upward for a distance of 16 to 20 in. At this point the lining is tapered back gradually to the regular diameter. The bosh of course must be supported by a solid plate at the tops of the tuyeres.

## Shrinkage Is Cause of Defect

**QUESTION** We are sending to you two sample castings made from 85-5-5-5 metal. Will you tell us what is causing this trouble?

**ANSWER** Since the two castings showed the same type of defect—a separation of a thin skin about 1/64-in. thick from the remainder of the casting—we fractured the ring. We found what we expected—a distinct illustration of centerline shrinkage. The section is about 5/32-in. as-cast, and all the machining is performed on one side to the point in some areas where the tool penetrates into the shrinky portion or leaves such a thin section that the pressure of the tool cracks it.

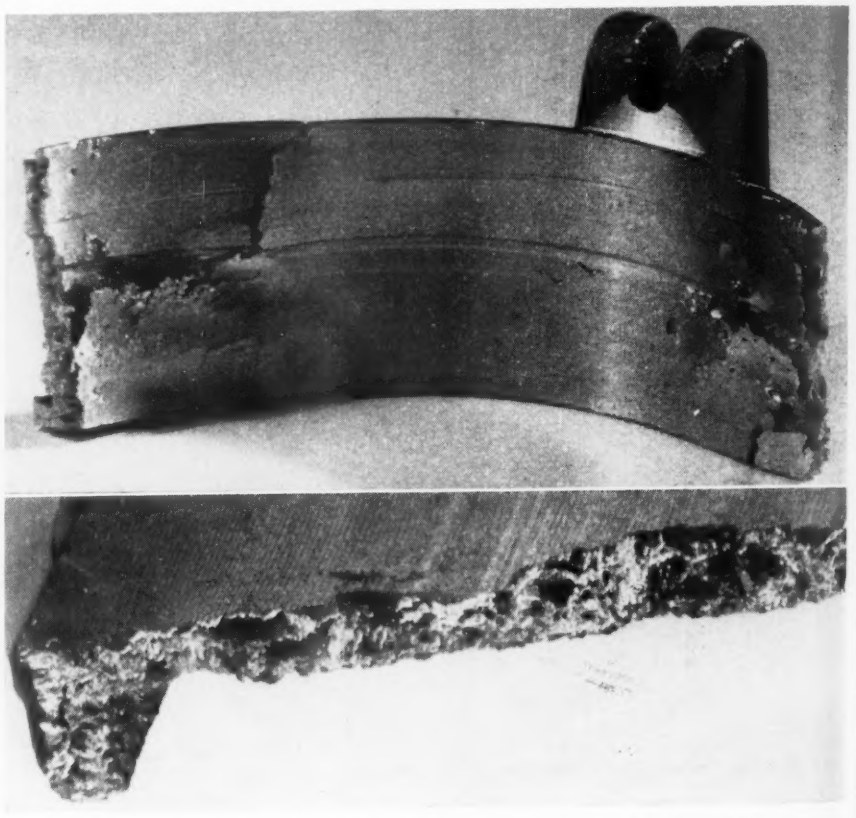
Possibly you may be able to eliminate some of the trouble by pouring the alloy on the cooler side, but essentially it is a gating problem. With thin-section castings the gates must be large enough to get the metal into the cavity quickly. If you are using only one gate to a cavity, it may be necessary to provide multiple gating if increasing the size of the present one is not a successful remedy. Fracturing the castings and examining the structure will show you quickly whether or not suitable results are being obtained. You may eliminate your difficulties on the first change in practice, but that does not always hold. Make only one change at a time.

## Glauconite Is Green Mineral

**QUESTION** We would like to obtain information on a material termed "glauconite" which we understand is found in certain molding sands in Germany, and which is alleged to impart a high degree of plasticity to the sands. A partial analysis of the material indicates a chemical formula of $(Fe_2O_3 \cdot Al_2O_3 \cdot K_2O \cdot MgO)SiO_2$. The glauconite is supposed to act similar to bentonite.

**ANSWER** Search of various sources indicates that glauconite is a green mineral which essentially is a hydrous silicate of iron with potassium. It occurs in sedimentary rocks, in muds and in green sand. Composition is variable; one analysis given as an average shows 49.3 per cent $SiO_2$, 3.6 per cent $Al_2O_3$, 22.7 per cent $Fe_2O_3$, 6.3 per cent FeO, 8.3 per cent $K_2O$, and 9.6 per cent $H_2O$.

Material may have some bonding power, but does not conform to compositions usually associated with clays and bentonites. For example, western bentonite roughly contains 59 per cent $SiO_2$, 19 per cent $Al_2O_3$, 2.8 per cent $Fe_2O_3$, 0.4 per cent FeO, 2 per cent MgO, 2.4 per cent $Na_2O$, 0.35 per cent $K_2O$, and 8 per cent $H_2O$.

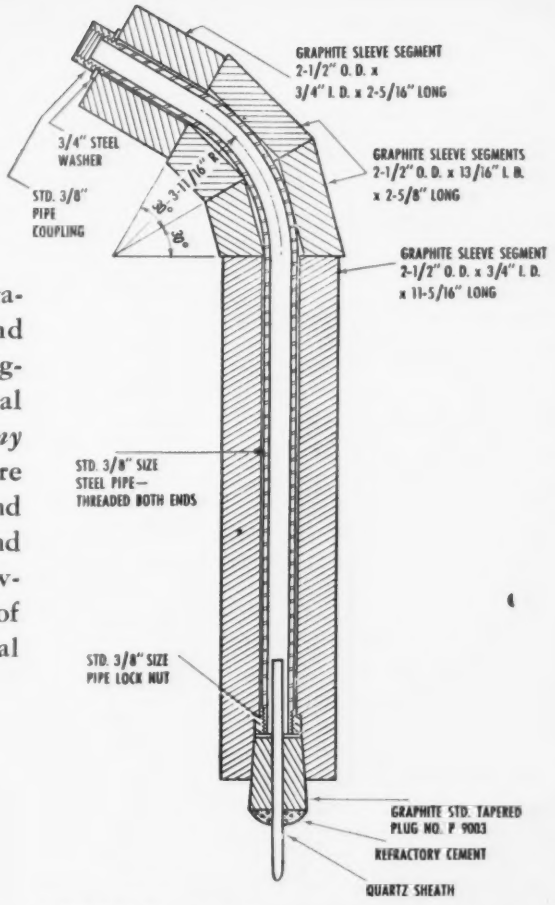


*Above*—Section of casting enlarged about 1½ times showing thin areas which lift up or crack after machining. *Below*—Fractured section enlarged about 4½ times to show the shrink area under the machined face

# *In Furnace and Foundry...*

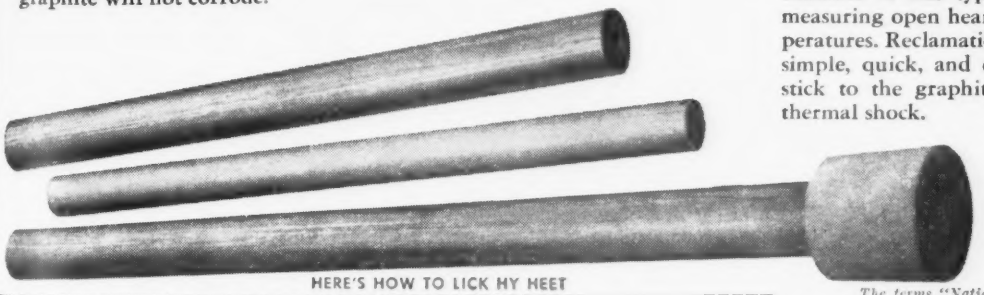
# These SMALL PARTS do a BIG JOB

● High temperature applications of "National" Carbon and Graphite are not limited to big-tonnage items. A part of National Carbon's service is to develop *any* application, however small, where the unique properties of carbon and graphite assure a convenience and economy to the user. In the following two instances, a few *pounds* of graphite serve literally *tons* of metal . . . efficiently and at a saving.


GRAPHITE SLEEVE SEGMENT
2-1/2" O. D. x
3/4" I. D. x 2-5/16" LONG
3/4" STEEL WASHER
STD. 3/8" PIPE COUPLING
GRAPHITE SLEEVE SEGMENTS
2-1/2" O. D. x 13/16" I. D.
x 2-5/8" LONG
GRAPHITE SLEEVE SEGMENT
2-1/2" O. D. x 3/4" I. D.
x 11-5/16" LONG
STD. 3/8" SIZE STEEL PIPE—THREADED BOTH ENDS
STD. 3/8" SIZE PIPE LOCK NUT
GRAPHITE STD. TAPERED PLUG NO. P 9003
REFRACTORY CEMENT
QUARTZ SHEATH

## "NATIONAL" GRAPHITE FLUXING TUBES

Can't be equalled by any other material for the introduction of purifying gases into molten metal. Graphite can't melt in the bath, can't contaminate the metal. Its low coefficient of expansion prevents cracking and spalling. Metal and dross do not adhere tightly to it. And whatever gases are used, graphite will not corrode.



## "NATIONAL" GRAPHITE-SHEATHED THERMOCOUPLE ASSEMBLY (Typical)

Only graphite could provide the degree of low-cost, trouble-free protection required by thermocouple assemblies of this type for the immersion method of measuring open hearth and electric furnace bath temperatures. Reclamation and maintenance for re-use are simple, quick, and economical. Molten metal won't stick to the graphite parts and they're immune to thermal shock.

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30 E. 42nd Street
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*PLEASE SEND INFORMATION ON:*

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**A Division of Union Carbide and Carbon Corporation**
***30 East 42nd Street, New York 17, New York***
*District Sales Offices:* Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
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. . . mark phenomenal acceptance of "EVEREADY" No. 1050 Industrial Flashlight Batteries by a broad cross-section of industry. Delivering twice the usable light of any battery we've ever made before, it will not swell, stick or jam in the flashlight . . . has no metal can to leak or corrode.

BLAST FURNACE LININGS • BRICK • CINDER NOTCH LINERS • CINDER NOTCH PLUGS • SKIMMER BLOCKS • SPLASH PLATES • RUNOUT TROUGH LINERS • MOLD PLUGS • TANK HEATERS

# MEN of Industry

**GEORGE K. DREHER** has resigned as executive director, Foundry Educational Foundation, Cleveland, and will join the Waukesha Foundry Co., Waukesha, Wis., effective May 1, as reported last month in "Late Foundry News." He will be succeeded as FEF executive director, by **Edward J. Walsh,** who until recently was executive secretary, National Foundry Association, Chicago. Mr. Dreher will be in charge of Waukesha's production research, personnel and development, and a director of the company. He attended Lawrence College, Appleton, Wis., and in 1930 joined Ampco Metal Inc., Milwaukee. He was vice president-manufacturing there when he left in 1946 to become vice president-general manager, Rogers Pattern & Foundry Co., Los Angeles. Early in 1947 he was appointed the first executive director of the newly formed Foundry Educational Foundation where he has played a prominent part in the rapid development experienced by that organization during the last five years.

♦ ♦ ♦

**Edward J. Walsh** who will succeed **George K. Dreher** as executive director, Foundry Educational Foundation, Cleveland, for over a year has been executive secretary, National Foundry Association, Chicago. Mr. Walsh was graduated from St. Mary's College, later taking graduate work in economics at Georgetown and Harvard Universities. He joined NFA in May, 1950, and became acting secretary the following year.

♦ ♦ ♦

**Lewis D. Reiff,** formerly assistant general manager, has been named vice president, steel foundry operations, Superior Steel & Malleable Castings Co., Benton Harbor, Mich. Mr. Reiff was graduated from Purdue University and joined the company as a special assistant in 1944. He was previously associated with Buckeye Steel Castings Co., Columbus, O., and American Steel Foundries, Granite City, Ill. **P. Richmond Schilling** has been appointed vice president of malleable foundry operations at Superior Steel. A graduate of the Rensselaer Polytechnic Institute, Mr. Schilling has been assistant to the president since he joined the company in 1937. He was previously associated with Malleable Founders' Society, Cleveland, and General Electric Co., Schenectady, N. Y.

♦ ♦ ♦

**Harold H. Miller** recently was named to the position of foundry superintendent of the Buick Motor Division, GMC, Flint, Mich., succeeding **E. H. Bankard,** resigned. Mr. Bankard, with the company 22 years, had been superintendent since 1949. Mr. Miller entered General Motors Institute as a co-operative student in 1936 and became a metallurgist 4 years later. During World War II he was plant metallurgist at Buick's aircraft engine assembly plant in Melrose Park, Ill., and returned to Flint in 1945. **Harold T. McGrath,** who has been plant metallurgist for 2 years, has been named assistant chief metallurgist, the position Mr. Miller had held since 1951. Mr. McGrath joined Buick in 1941, following graduation from Michigan State College.

♦ ♦ ♦

**Karl S. Howard** has been named assistant vice president, Foundry Division, Canadian Car & Foundry Co. Ltd., Montreal, Canada. Mr. Howard was recently consultant to the Ordnance Tank-Automotive Centre, Detroit, and the Philadelphia Ordnance District Office. He was formerly associated with General Steel Castings Corp., Granite City, Ill.

♦ ♦ ♦

**Jarl A. Havnen** has been appointed foundry manager, Wilkening Mfg. Co., Philadelphia. Mr. Havnen was

(*Continued on page* 124)

GEORGE K. DREHER
*. . . joins Waukesha Foundry*

EDWARD J. WALSH
*. . . executive director FEF*

P. RICHMOND SCHILLING
*. . . heads malleable foundry*

LEWIS D. REIFF
*. . . Superior Steel executive*

# APEX

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NEW AND MODERN SMELTING PLANT
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LOS ANGELES

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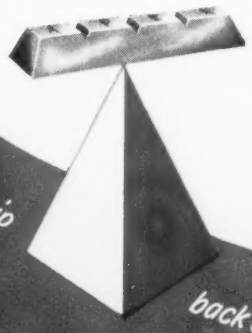
Now available to an enlarged industrial market are the advantages that come of Apex leadership in the production of aluminum, magnesium and zinc alloys to quality standards. This advanced western plant is designed specifically for scientific production and superior service. Its modern equipment includes complete laboratory facilities and the amazing quantometer that provides rigid metallurgical control unsurpassed by any other method. Call on Apex to meet your most exacting requirements. You'll find us ready and able in Chicago, Cleveland . . . and now Los Angeles.



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**ALUMINUM ALLOYS • MAGNESIUM ALLOYS • ZINC ALLOYS**

ALUMINUM BASE HARDENERS • ALUMINUM FOR STEEL DEOXIDIZING • GRAINED ALUMINUM • ALUMINUM FLUX • MAGNESIUM ANODES • ZINC ALLOY FOR METAL FORMING DIES • SPECTROGRAPHIC STANDARDS • ANALYSIS SERVICE (CHEMICAL AND SPECTROGRAPHIC) • LABORATORY SERVICE (PHYSICAL TESTING)

ROBERT H. ZOLLER
. . . *heads new company*

TED OPERHALL
. . . *Misco vice pres.*

WALTER A. STUHR
. . . *joins May-Fran Engineering*

WILLIAM L. MANLY
. . . *division sales, Allis-Chalmers*

(*Continued from page* 122)
previously foundry superintendent, Liquid Carbonic Corp., Chicago, and Wells Mfg. Co., Skokie, Ill.

♦ ♦ ♦

**Robert H. Zoller,** of Zoller Casting Co., Bettsville, O., a small mechanized production gray iron foundry, has been elected president of the recently organized Melting Research Inc., there. Before he built his own foundry, which he will continue to head, Mr. Zoller was superintendent of melting operations, Saginaw Malleable Division, General Motors Corp., for 4 years. Prior to that he had been melting metallurgist 2 years with Valley Steel Casting Co., Bay City, Mich., and chemist and melter 4 years with Wehr Steel Co., Milwaukee.

♦ ♦ ♦

**Lewis A. Dibble,** since 1935 president, has been made chairman of the board of directors, Eastern Malleable Iron Co., Naugatuck, Conn. **Charles E. Brust,** for a number of years vice president, was named to succeed Mr. Dibble. **Dudley V. Walker,** who joined Eastern in 1919 and since 1943 has been general manager of the company's Eberhard Mfg. Co. division, Cleveland, and **George J. Behrendt,** general manager of the Naugatuck plant, have been elected vice presidents of the parent company. **F. Leslie Howard** has been named treasurer, and **Russell C. Adams,** secretary, succeeding **Emil Mannweiler,** recently secretary-treasurer, who has retired following 58 years with the company. **James R. Dilley** is the new assistant secretary-treasurer.

♦ ♦ ♦

**Ted Operhall** was recently appointed vice president-general manager, Misco Precision Casting Co., Detroit Division. Mr. Operhall was associated with Ford Motor Co. from 1937 to 1944, when he joined the research laboratory of Bendix Aviation Corp., Detroit. In 1948 he joined Michigan Steel Casting Co., Detroit, as project engineer, and two years later became assistant manager and chief engineer. **Charles W. Schwartz** has been named production manager of Misco's Whitehall Division, Whitehall, Mich., and **Charles Yaker** has become production manager of the company's Detroit Division.

♦ ♦ ♦

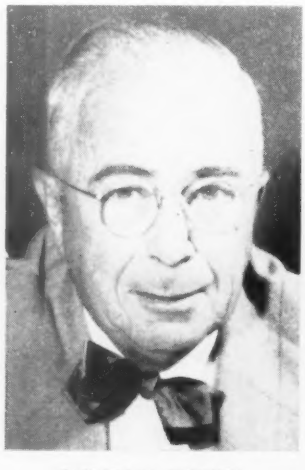
**Walter A. Stuhr** has joined May-Fran Engineering Inc., Cleveland, as regional sales engineer of the midwestern office recently opened at 53 West Jackson Blvd., Chicago, where he will represent the company's line of conveyors, scrap handling systems, etc. Mr. Stuhr attended Purdue University and Armour Institute of Technology and for more than 15 years has worked in the materials handling industry.

♦ ♦ ♦

**William L. Manly,** for several years special assistant to the vice president-director of sales, General Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee, has been named assistant director of the division's sales. Mr. Manly joined the company in 1937

(*Continued on page* 126)

LEWIS A. DIBBLE
. . . *becomes board chairman*



DUDLEY V. WALKER
. . . *v. p., Eastern Malleable*

GEORGE J. BEHRENDT
. . . *Eastern Malleable v. p.*

CHARLES E. BRUST
. . . *pres., Eastern Malleable*

**MR. C. M. DALE,**
*Vice President*

## LIBERTY FOUNDRIES CO.

Mr. Dale reports: "The Dustube Collectors have been a profitable investment for many reasons: (1) they effectively control all dust, making our foundry a better place to work. (2) Dust formerly exhausted into the neighborhood is now collected. (3) Dustubes cost less to operate and maintain."

**MR. JAMES REDDRICK,**
*Superintendent of Maintenance*

## OLIVER CORP.

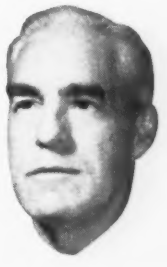
This company uses one large Dustube Collector to ventilate 6 double end grinders, 6 tumbling mills, a Wheelabrator Cabinet and 2 Wheelabrator Tumblasts. Mr. Reddrick says: "The Dustubes are the most trouble-free units in our whole plant. We have not spent a dime for repairs in years."

# A 4-FOUNDRY REPORT on DUST CONTROL

**MR. A. E. PORTER,**
*Manager*

## HOWARD FOUNDRY CO.

Semi-Steel Div. — Six grinding stands and 5 pieces of casting cleaning equipment are ventilated by a Dustube Collector. Mr. Porter reports: "In terms of efficiency and cost saving performance, our Dustubes are the best investment we have ever made." Dust counts have shown that all harmful dust is exhausted.



**MR. I. C. SHEPPARD,**
*Works Manager*

## BEACH FOUNDRY, LTD.

More than 29,000 C.F.M. are handled in three Dustube Collectors in this modernly equipped gray iron foundry. Although the operations ventilated are the foundry's heavy dust creating processes, a survey by independent engineers revealed the dust count in the cleaning department was exceptionally low.

All four of the foundrymen above agree on one point:
"Although foundry dust is expensive and troublesome, it can be controlled effectively and economically with Dustube Collectors."
They have found that Dustubes remove dust with virtually 100% efficiency from the heaviest dust creating operations.
And, in spite of their efficiency, operating and maintenance costs for these collectors are exceptionally low.

Dustubes can give you the same efficient low cost dust removal for your plant.

*Catalog 372 explains reasons why Dustube Collectors control dust more efficiently at lower cost. Send for your copy today.*

**American**
**WHEELABRATOR & EQUIPMENT CORP.**
**505 S. Byrkit St., Mishawaka, Indiana**

**dustube**
**COLLECTORS**

M. A. DANTZLER
*. . . joins Walter Gerlinger*

K. E. BLESSING
*. . . Wheelabrator district mgr.*

GEORGE F. BURDITT
*. . . Wheelabrator district mgr.*

GEORGE C. TOLTON
*. . . district mgr., Wheelabrator*

(*Continued from page* 124)

as Chicago office field engineer. He became manager of the water conditioning department in 1942 and 6 years later was named manager of dealer sales.

♦ ♦ ♦

**M. A. Dantzler** has joined Walter Gerlinger Inc., Milwaukee, where he will be engaged in general sales and promotion of the foundry equipment made by the company. Mr. Dantzler was formerly works manager and in recent years assistant to the vice president in charge of manufacturing at the Milwaukee plant, Universal-Rundle Corp., New Castle, Pa., maker of plumbing fixtures.

♦ ♦ ♦

**Elden L. Auker,** formerly Detroit district manager, Bay State Abrasive Products Co., Westboro, Mass., has been named sales manager for the company, succeeding **E. Halsey Bristler,** who has been made director of product development and quality control. Following graduation from Kansas State College in 1932, Mr. Auker entered professional baseball and pitched with several American League teams, including the Detroit Tigers, 1934 and 1935 league champions and winner of the 1935 World Series. **S. Gordon Saunders** has been appointed Detroit district manager in Mr. Auker's former territory. Mr. Saunders was graduated from University of Kansas in 1922. Recently he was general manager, Cycleweld Division, Chrysler Corp., Detroit.

♦ ♦ ♦

**William Hagel,** vice president-sales, and **Maurice P. Sieger,** vice president-senior engineer, United Engineering & Foundry Co., Pittsburgh, have been named company directors.

♦ ♦ ♦

**Oscar F. Stewart** has been appointed executive staff assistant, Commercial Contracting Corp., Detroit, where he will supervise systems and procedures in all offices of the company. Mr. Stewart recently resigned as associate director of case analysis, Wage Stabilization Board.

**K. E. Blessing** has been appointed district manager in Hoboken, N. J., American Wheelabrator & Equipment Corp, Mishawaka, Ind. **F. John Pichard** has been made sales engineer there. Mr. Blessing, a graduate of Purdue University, joined the company 5 years ago as sales engineer, and later served as New York manager. **George F. Burditt** has been named Pittsburgh district manager. He became a sales engineer in the Pittsburgh office more than 5 years ago. **George C. Tolton** has succeeded Mr. Burditt as district manager in the Greensboro, N. C., office. He has been in the Washington office over 6 years.

♦ ♦ ♦

**Fred S. Middleton** has been appointed sales manager of DeBardeleben Coal Corp., Birmingham, producer of coal, coke and coal chemicals. Mr. Middleton was graduated from the University of Tennessee, and from 1937 through 1941 was with Tennessee Coal & Iron Division, U.

(*Continued on page* 128)

S. GORDON SAUNDERS
*. . . Bay State sales*

ELDEN L. AUKER
*. . . sales mgr., Bay State*

OSCAR F. STEWART
*. . . joins contracting company*

FRED S. MIDDLETON
*. . . coal and coke sales*

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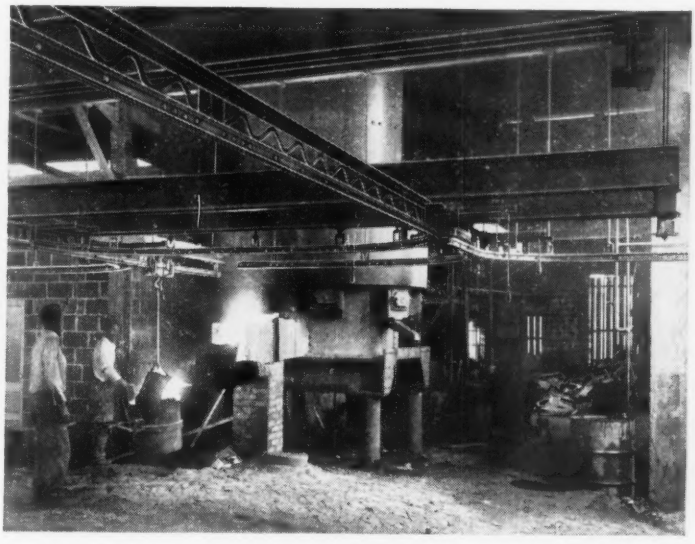
- **INCREASES PLANT CAPACITY AND PRODUCTION**
- **REDUCES HANDLING COSTS, DAMAGE AND LOSS**

American MonoRail Engineers can show you how to get more profitable production out of your plant by systematizing material handling. Let them show you how to convert lost ceiling space to profit—how to eliminate obstructive storage around machines—lessen worker fatigue—reduce heavy load accidents—stop damage to product in motion.

Bring us your handling problems —American MonoRail can provide the equipment best suited to your needs.



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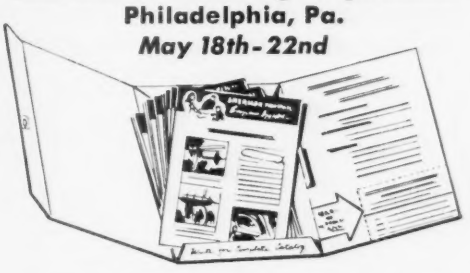
**Materials Handling Exposition**

**Philadelphia, Pa.**

***May 18th-22nd***



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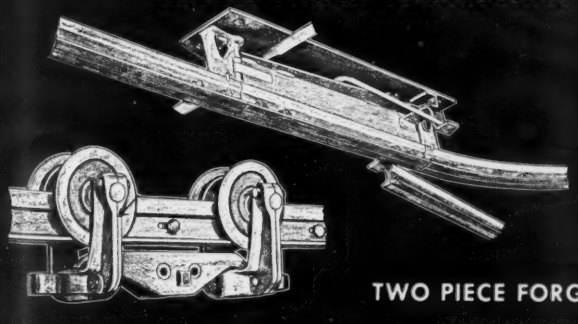
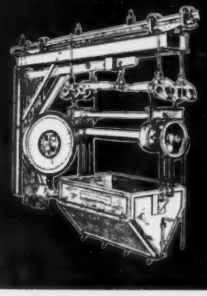
RUGGED SWITCH CONSTRUCTION



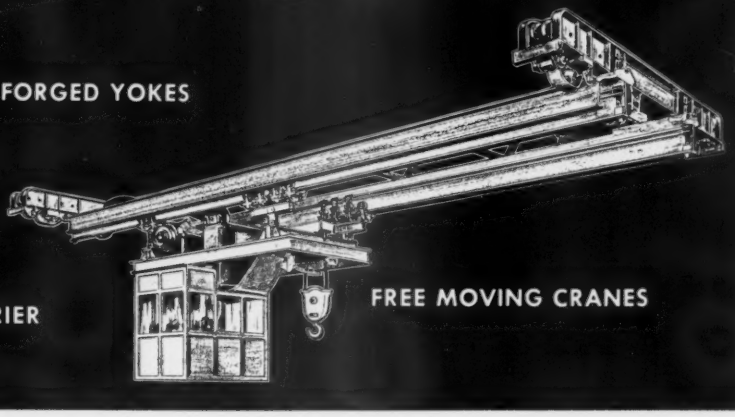
OVERLAPPING SPLICE

TWO PIECE FORGED YOKES





SCALE HOIST CARRIER



FREE MOVING CRANES

FRED B. SHEW
. . . dept. manager, Wellman

ELMER E. BRAUN
. . . GMC mfg. mgr.

(*Continued from page* 126)

S. Steel Corp. After service with the Army Corps of Engineers the ensuing 5 years, he joined Jackson Industries Inc., Birmingham, as works manager. Later he was made vice president in charge of operations and recently was vice president in charge of sales.

♦ ♦ ♦

**Fred B. Shew,** formerly district manager of the Chicago office, Wellman Engineering Co., has been named sales manager of the bucket department, with headquarters in the Cleveland home office where he will supervise distribution of the company's clamshell and dragline buckets, log and stone grabs. Mr. Shew previously was New York office district manager.

♦ ♦ ♦

**Renard Brown,** for the past 5 years foundry foreman, Anstice Foundry, Rochester, N. Y., has been appointed sales representative in southern New York and northeastern Pennsylvania, Foundry Supplies Division, Frederic B. Stevens Inc., Detroit, with headquarters in the Buffalo office. **Paul E. Williams** has been named representative in the Indianapolis area. Mr. Williams was formerly associated with Foster Machine Co., and Chicago Telephone Supply Co., in Elkhart, Ind.

♦ ♦ ♦

**Elmer E. Braun,** formerly assistant manufacturing manager, has been named manufacturing manager, Central Foundry Division, General Motors Corp. with headquarters in Saginaw, Mich., succeeding **S. W. Healy** who has resigned. Mr. Braun joined Central Foundry Division's Saginaw malleable iron plant in 1929 as a co-operative student of GMC Institute. Four years later, following graduation, he was assigned to the local plant's inspection department and became its chief inspector in 1940. In 1945 he became manufacturing superintendent of the division's Danville, Ill., plant, and manager there in 1946. He was named assistant manufacturing manager of the division in 1951.

**Cyril S. Taylor,** chief of the Physical Chemistry Division, Aluminum Research Laboratories, New Kensington, Pa., has retired following 32 years service with Aluminum Co. of America. Mr. Taylor joined the company following several years with National Bureau of Standards, Washington. He has been chief of the division 23 years. **Dr. Allen S. Russell,** since 1946, assistant division chief, has succeeded Mr. Taylor. **Dr. L. M. Foster** has been named assistant chief. **Dr. Robert C. Plumb** and **R. C. Geiger** have been transferred to the division.

♦ ♦ ♦

**Doyle Beasley** has been appointed assistant superintendent of night operations, Temco Aircraft Corp., Dallas, Tex. In 1940 Mr. Beasley joined North American Aviation Inc., Dallas, where he became assistant general foreman. He joined Temco in 1946 and became general foreman of sheet metal preparation and the foundry in 1951.

♦ ♦ ♦

**J. E. Waugh** has been named manager of foundry operations, General Electric Co., Schenectady, N. Y. Named to the same position in Erie, Pa., is **L. A. Dunn,** and in Elmira, N. Y., **R. H. Roberts** will manage foundry operations. **Joseph B. Stazinski** was recently named manager of the Everett and Lynn, Mass., foundries.

♦ ♦ ♦

**E. P. Roudebush,** for over a year works manager, Roots-Connersville Blower, division of Dresser Industries Inc., Dallas, Tex., has been named vice president and works manager in charge of manufacturing activities at the Connersville, Ind., and Delaware, O., plants. Mr. Roudebush,

(*Concluded on page* 130)

RENARD BROWN
. . . F. B. Stevens sales, Buffalo

PAUL E. WILLIAMS
. . . Indianapolis sales, Stevens

E. P. ROUDEBUSH
. . . Roots-Connersville v. p.

D. A. JOHANN
. . . v. p.-sales, Connersville

**TOO MANY REJECTS?**

*To tell you the truth* where I worked before the **CASTINGS WERE BETTER**—they used Famous Cornell Cupola Flux."

**MOLTEN IRON IS CLEAN**

**HOTTER**

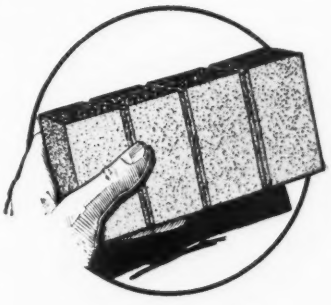
**MORE FLUID**

**SULPHUR REDUCED**

•

**SLAG KEPT FLUID**

Approx. 4 pound brick



**The advantage of pre-measured SCORED BRICK FORM**

It is easy to use, takes less time to use, permits accurate use and reduces waste. You simply lift Famous Cornell Cupola Flux from container and toss into cupola with each ton charge of iron, or break off one to three briquettes (quarter sections) for smaller or fractional charges, as per instructions.

**WRITE FOR BULLETIN NO. 46-B**

Casting scrap is minimized where

## *Famous* CORNELL CUPOLA FLUX

is used with every charge of iron.

Outstanding gray iron foundries, and *malleable foundries with cupolas,* keep the standard of their castings high and minimize delays in shipment caused by make-overs, by using this *time-proven metal cleanser.* Better castings not only reduce your costs but make for better customer satisfaction.

**REDUCES CUPOLA DOWN TIME, MAINTENANCE.**

Famous Cornell Cupola Flux keeps cupolas cleaner, practically eliminates bridging over. Furthermore, its action causes the formation of a glazed or vitrified surface on cupola lining, reducing erosion of brick or stone and minimizing repairs.

## *The Cleveland Flux Co.*

**026-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO**

*Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes – Since 1918*

FAMOUS CORNELL FLUXES

Trade Mark Registered

**BRASS FLUX**

FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

**ALUMINUM FLUX**

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

G. A. TAMBLYN
*. . . Hough sales chief*

MARIO OLIVO
*. . . receives Order of Merit*

(*Concluded from page* 128)

graduated from Ohio State University, joined Dresser Industries in 1944 as director of industrial engineering. In 1950 he was named assistant to the vice president of manufacturing, Roots-Connersville. **D. A. Johann** has been made vice president of sales activities in Connersville and for division branch offices and dealers. Mr. Johann joined Roots-Connersville in 1946 as Chicago district office manager and has been general sales manager for the division since 1951.

♦ ♦ ♦

**John C. Pangborn Jr.** has been appointed sales manager in a territory recently formed by Pangborn Corp., comprising sections of central Pennsylvania, West Virginia, Ohio, Kentucky and western Maryland. Mr. Pangborn, son of John C. Pangborn, vice president of the company, was graduated from University of Pittsburgh and served in both production and sales positions with the company, maker of blast cleaning and dust control equipment. His headquarters will be at the Pangborn Hagerstown, Md., plant.

♦ ♦ ♦

**G. A. Tamblyn** has been appointed sales manager, Frank G. Hough Co., with headquarters in Libertyville, Ill. Mr. Tamblyn has been with Hough 11 years, engaged in sales, application and marketing of the company's tractor-shovels and tractors. He became assistant sales manager in 1948.

♦ ♦ ♦

**Claude A. Gates,** previously vice president, Wheelco Instruments Co., Chicago, has been named sales-service representative, the Claud S. Gordon Co., Chicago, manufacturer of temperature control and metallurgical testing instruments and machines. Mr. Gates will represent the company in New York city, northern New Jersey, Long Island and Westchester, N. Y., and western Connecticut.

♦ ♦ ♦

**Henry Levitt,** vice president, Bohn Aluminum & Brass Corp., and general manager, Michigan Smelting & Refining Division, Detroit, recently completed 50 years of service with the company. Mr. Levitt joined Michigan Smelting as a bookkeeper, telephone operator and scrap sorter and grew with the plant's expansion until he was named to manage the company, which is now Bohn Aluminum's subsidiary.

♦ ♦ ♦

**Mario Olivo,** president, National Association of Foundry Machinery and Equipment Suppliers, Milan, Italy, was recently honored by the Italian Republic by presentation of the Order of Merit. Mr. Olivo, president and owner of Impianti Fonderie Olivo, Milan, is well known in America. He has been an outstanding member of the International Committee of Foundry Technical Associations, and is chairman of its Dictionary of Foundry Terms Committee.

♦ ♦ ♦

**J. A. McCabe** has been appointed general production manager, Aircraft Engine Division, Ford Motor Co., Chicago. Mr. McCabe has been with Ford's Tank Division in Livonia, Mich.

♦ ♦ ♦

**Edward H. Platz Jr.** has returned to Lebanon Steel Foundry, Lebanon, Pa., as manager of alloy sales, following leave of absence to serve as nickel specialist, Iron and Steel Division, National Production Authority, Washington.

♦ ♦ ♦

**Kenneth M. Smith** has been appointed foundry survey engineer, Carl E. Rowe & Co., consulting engineers, Milwaukee. Mr. Smith recently served as a foundry consultant for the Mutual Security Agency's technical assistance program in Italy. Prior to that he was associated with Hansell-Elcock Co., Chicago, as assistant to the president.

JOHN C. PANGBORN JR.
*. . . Pangborn sales manager*

CLAUDE A. GATES
*. . . joins Claud S. Gordon Co.*

HENRY LEVITT
*. . . v. pres., Bohn Aluminum*

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Illustration shows mold half from an "ACCURATE" drag pattern in production at Federal Malleable Company, Milwaukee, Wisconsin.

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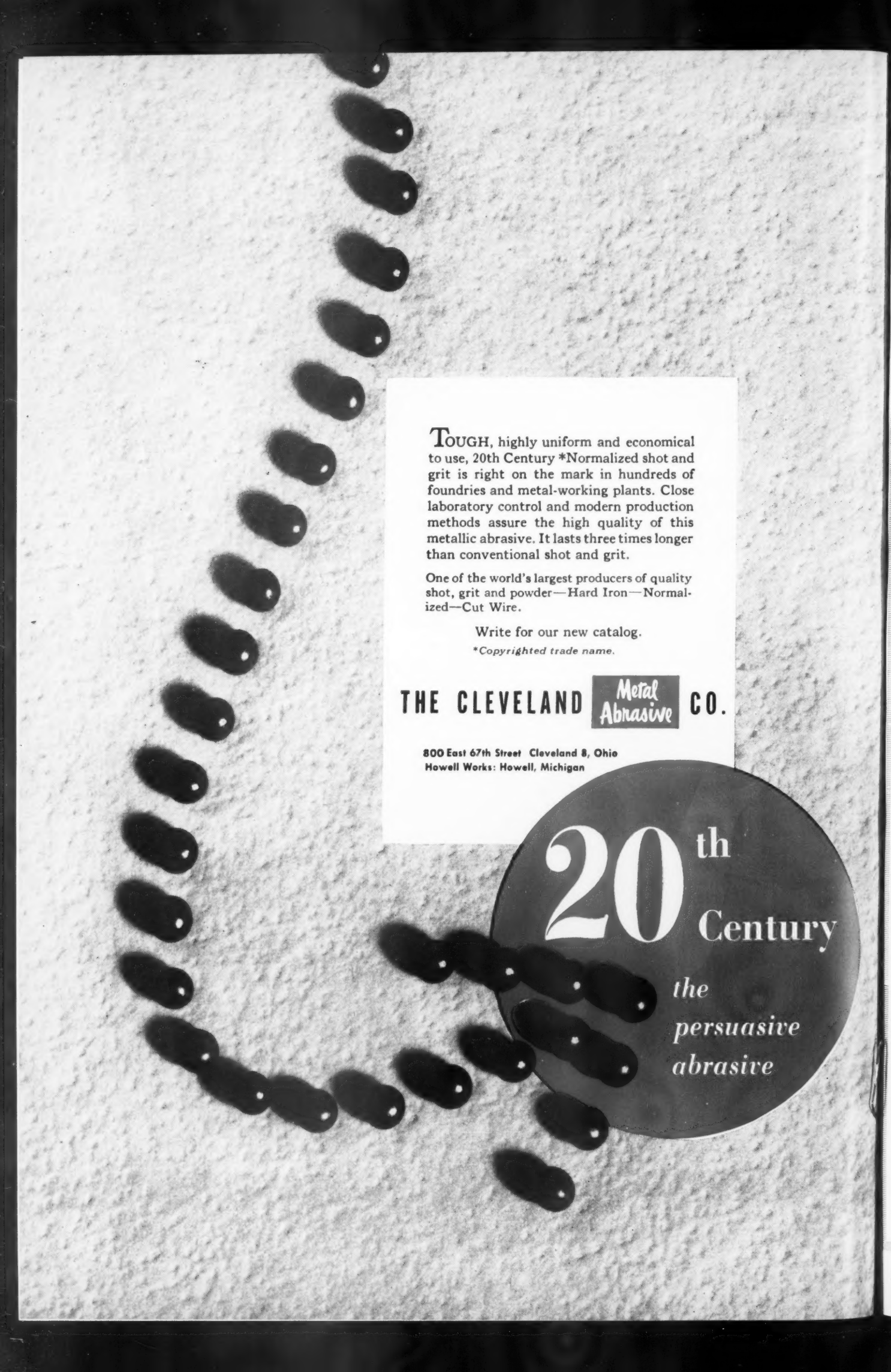
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# Foundry STATISTICS

## Malleable Iron

(Shipments of castings—net tons[1])

| | Shipments | | Unfilled Orders[2] |
|---|---|---|---|
| | Total | For Sale | |
| 1950 | 920,502 | 512,192 | ..... |
| 1951 | | | |
| Dec. | 76,045 | 45,543 | 215,134 |
| Total | 1,085,241 | 656,076 | ..... |
| 1952 | | | |
| Jan. | 87,003 | 54,988 | 202,799 |
| Feb. | 82,898 | 50,129 | 193,061 |
| Mar. | 80,960 | 49,084 | 196,896 |
| Apr. | 89,270 | 56,337 | 198,215 |
| May | 81,770 | 51,476 | 180,382 |
| June | 74,446 | 46,511 | 173,353 |
| July | 45,266 | 29,675 | 166,517 |
| Aug. | 63,716 | 39,308 | 162,832 |
| Sept. | 75,950 | 45,849 | 168,367 |
| Oct. | 88,062 | 52,922 | 168,609 |
| Nov. | 76,099 | 46,708 | 167,842 |
| Dec. | 80,680 | 50,485 | 173,494 |
| 12 mo. | 926,120 | 573,472 | ..... |

## Aluminum

(Shipments of castings—1000 pounds[1])

| | Shipments | | | | Unfilled Orders[2] |
|---|---|---|---|---|---|
| | Total | Sand | Perm. Mold | Die | |
| 1950 | 543,082 | 184,782 | 181,366 | 167,201 | ..... |
| 1951 | | | | | |
| Sept. | 41,864 | 16,490 | 11,793 | 12,293 | 112,973 |
| 9 mo. | 422,466 | 156,497 | 136,247 | 121,212 | ..... |
| Oct. | 45,419 | 17,694 | 13,495 | 13,049 | 110,382 |
| Nov. | 41,661 | 16,278 | 11,725 | 12,604 | 116,044 |
| Dec. | 40,907 | 16,202 | 11,262 | 10,891 | 110,249 |
| Total | 550,433 | 206,671 | 172,729 | 157,756 | ..... |
| 1952 | | | | | |
| Jan. | 46,424 | 18,051 | 12,236 | 13,884 | 109,654 |
| Feb. | 44,847 | 17,451 | 13,445 | 13,012 | 110,327 |
| Mar. | 46,448 | 19,017 | 13,673 | 12,880 | 104,749 |
| Apr. | 49,824 | 19,451 | 14,631 | 14,482 | 104,004 |
| May | 47,752 | 18,317 | 14,292 | 13,907 | 100,802 |
| June | 45,310 | 18,452 | 11,982 | 13,860 | 103,685 |
| July | 40,091 | 16,342 | 10,866 | 12,341 | 106,673 |
| Aug. | 46,761 | 18,477 | 12,397 | 12,884 | 112,852 |
| Sept. | 52,610 | 19,678 | 14,900 | 17,651 | 122,181 |
| 9 mo. | 420,867 | 165,236 | 118,422 | 124,901 | ..... |

## Copper-Base Alloy

(Shipments of castings—1000 pounds[1])

| | Shipments | | | Unfilled Orders[2] |
|---|---|---|---|---|
| | Total | Sand | Perm. Mold | |
| 1950 | 1,056,973 | 953,590 | 55,614 | ..... |
| 1951 | | | | |
| Sept. | 89,567 | 79,676 | 5,493 | 84,611 |
| 9 mo. | 905,825 | 812,811 | 52,705 | ..... |
| Oct. | 99,355 | 88,332 | 6,237 | 82,491 |
| Nov. | 92,102 | 82,270 | 6,043 | 82,667 |
| Dec. | 80,259 | 72,813 | 4,958 | 80,294 |
| Total | 1,177,541 | 1,056,226 | 69,943 | ..... |
| 1952 | | | | |
| Jan. | 89,616 | 80,376 | 6,233 | 78,316 |
| Feb. | 86,231 | 77,813 | 5,204 | 75,279 |
| Mar. | 88,642 | 79,437 | 6,182 | 72,463 |
| Apr. | 84,460 | 75,590 | 5,914 | 70,602 |
| May | 81,903 | 73,723 | 5,420 | 70,252 |
| June | 75,359 | 67,748 | 4,858 | 70,797 |
| July | 64,762 | 58,931 | 3,637 | 74,739 |
| Aug. | 77,094 | 69,754 | 5,106 | 73,928 |
| Sept. | 84,230 | 76,844 | 4,651 | 73,483 |
| 9 mo. | 732,297 | 660,020 | 47,205 | ..... |

## Magnesium

(Shipments of castings—1000 pounds[1])

| | Shipments | | Unfilled Orders[2] |
|---|---|---|---|
| | Total | For Sale | |
| 1950 | 15,224 | 13,310 | ..... |
| 1951 | | | |
| Sept. | 2,551 | 2,306 | 16,407 |
| 9 mo. | 23,296 | 20,363 | ..... |
| Oct. | 2,977 | 245 | 16,143 |
| Nov. | 3,946 | 2,954 | 15,550 |
| Dec. | 2,916 | 2,525 | 14,729 |
| Total | 33,135 | 28,596 | ..... |
| 1952 | | | |
| Jan. | 3,569 | 3,083 | 14,047 |
| Feb. | 3,368 | 2,940 | 14,459 |
| Mar. | 3,319 | 2,972 | 13,279 |
| Apr. | 3,051 | 2,751 | 13,244 |
| May | 3,002 | 2,698 | 13,041 |
| June | 2,948 | 2,699 | 12,094 |
| July | 2,654 | 2,393 | 12,948 |
| Aug. | 2,722 | 2,486 | 13,178 |
| Sept. | 3,470 | 3,074 | 15,540 |
| 9 mo. | 28,102 | 25,096 | ..... |

## Foundry Production Workers

### Estimated Number

(thousands)

| | Nov. 1952 | Oct. 1952 | Nov. 1951 |
|---|---|---|---|
| Ferrous | 239.0 | 236.3 | 250.3 |
| Nonferrous | 100.6 | 97.3 | 90.2 |

### Average Weekly Earnings

| | | | |
|---|---|---|---|
| Gray Iron | $74.23 | $74.34 | $68.96 |
| Malleable Iron | 77.18 | 75.74 | 70.62 |
| Steel | 81.08 | 79.30 | 76.28 |
| Nonferrous | 81.78 | 82.07 | 74.35 |

### Average Weekly Hours

| | | | |
|---|---|---|---|
| Gray Iron | 41.1 | 41.6 | 41.0 |
| Malleable Iron | 40.9 | 40.7 | 40.4 |
| Steel | 42.1 | 42.0 | 43.0 |
| Nonferrous | 42.2 | 42.5 | 41.4 |

### Labor Turnover Rate (Nov.)

(Per 100 employees)

| | Total Accession | Total Separation | Quit | Layoff |
|---|---|---|---|---|
| Gray Iron | 3.8 | 5.3 | 2.5 | 2.0 |
| Malleable Iron | 4.5 | 3.4 | 2.0 | 0.5 |
| Steel | 3.6 | 3.5 | 2.2 | 0.4 |
| Nonferrous | 5.5 | 4.5 | 3.1 | 0.4 |

Source: Bureau of Labor Statistics

## Gray Iron Castings—Shipments

(net tons[1])

| | All Castings | | Miscellaneous Castings | | Heavy Steel Ingot Molds | | Chilled Railroad Car Wheels | | Pressure Pipe & Fittings | Soil Pipe & Fittings | Unfilled Orders[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | For Sale | Total | For Sale | Total | For Sale | Total | For Sale | Total[2] | Total[2] | |
| 1950 | 12,905,562 | 6,880,352 | 8,117,748 | 3,415,281 | 2,308,661 | 1,043,590 | 514,074 | 456,402 | 1,203,762 | 761,317 | ..... |
| 1951 | | | | | | | | | | | |
| Dec. | 1,032,799 | 582,614 | 646,352 | 309,696 | 204,911 | 94,857 | 41,594 | 38,119 | 108,767 | 31,175 | 1,847,065 |
| Total | 14,988,555 | 8,453,048 | 9,573,347 | 4,471,539 | 2,614,517 | 1,257,542 | 639,996 | 563,272 | 1,473,192 | 687,503 | ..... |
| 1952 | | | | | | | | | | | |
| Jan. | 1,199,285 | 694,498 | 745,548 | 359,806 | 225,704 | 110,263 | 57,155 | 53,551 | 125,729 | 45,149 | 1,800,905 |
| Feb. | 1,155,143 | 654,833 | 733,067 | 348,855 | 219,251 | 105,918 | 50,444 | 47,649 | 107,669 | 44,712 | 1,766,434 |
| Mar. | 1,172,017 | 660,920 | 723,225 | 334,492 | 228,799 | 110,607 | 53,919 | 49,747 | 115,843 | 50,231 | 1,711,037 |
| Apr. | 1,204,801 | 652,962 | 773,538 | 347,121 | 204,805 | 85,239 | 48,506 | 42,650 | 117,929 | 60,023 | 1,614,426 |
| May | 1,100,630 | 620,049 | 698,332 | 317,150 | 186,998 | 91,980 | 44,229 | 39,848 | 117,586 | 53,485 | 1,459,305 |
| June | 835,263 | 502,322 | 616,895 | 292,846 | 19,467 | 10,575 | 44,066 | 44,066 | 103,335 | 51,500 | 1,445,521 |
| July | 636,141 | 431,889 | 427,475 | 227,794 | 14,794 | 10,223 | 40,783 | 40,783 | 96,784 | 56,305 | 1,409,684 |
| Aug. | 1,001,629 | 602,025 | 596,369 | 295,861 | 198,816 | 99,760 | 35,606 | 35,606 | 108,313 | 62,485 | 1,513,166 |
| Sept. | 1,119,373 | 625,680 | 676,732 | 309,299 | 230,219 | 107,987 | 39,912 | 35,884 | 107,847 | 64,663 | 1,450,723 |
| Oct. | 1,233,480 | 684,321 | 759,131 | 340,695 | 243,462 | 117,255 | 45,664 | 41,148 | 117,089 | 68,134 | 1,391,609 |
| Nov. | 1,060,735 | 590,334 | 649,316 | 296,674 | 218,349 | 104,035 | 41,655 | 38,210 | 99,196 | 52,219 | 1,309,252 |
| Dec. | 1,141,658 | 619,070 | 713,332 | 321,939 | 247,605 | 116,410 | 42,957 | 42,957 | 95,198 | 42,566 | 1,316,308 |
| Total | 12,860,155 | 7,338,903 | 8,112,960 | 3,792,532 | 2,238,269 | 1,070,252 | 544,896 | 512,099 | 1,312,518 | 651,472 | ..... |

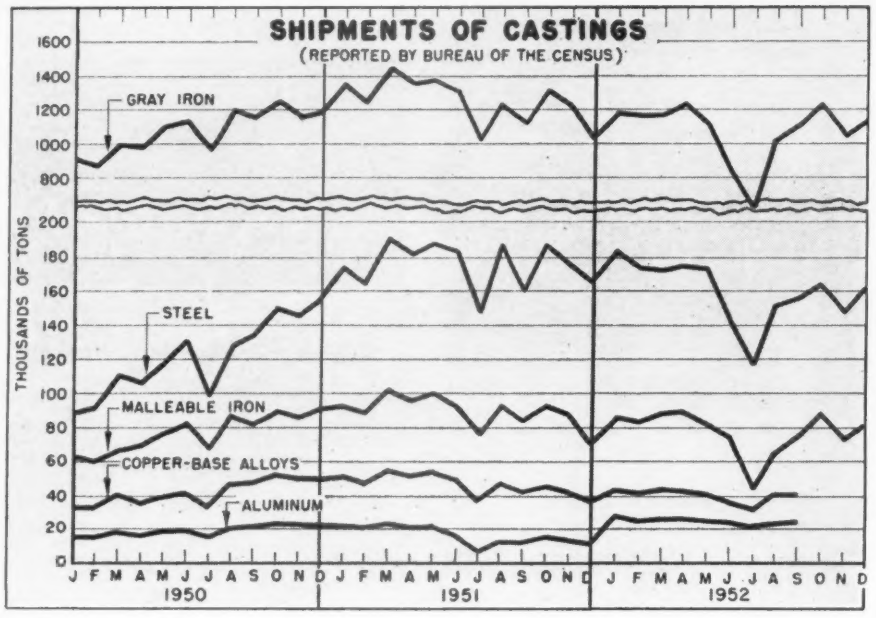
## Steel Castings—Shipments

(Net tons[1])

| | All Castings | | | Carbon Steel | | | Alloy Steel | | | Unfilled Orders[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | For Sale | Railway Specialties | Total | For Sale | Railway Specialties | Total | For Sale | Railway Specialties | |
| 1950 | 1,459,382 | 1,042,884 | 261,357 | 1,081,162 | 788,619 | 243,215 | 379,220 | 254,265 | 18,142 | ..... |
| 1951 | | | | | | | | | | |
| Dec. | 165,110 | 123,448 | 33,213 | 119,762 | 89,298 | 29,341 | 45,348 | 34,150 | 3,872 | 846,436 |
| Total | 2,050,054 | 1,506,903 | 466,172 | 1,541,280 | 1,162,687 | 415,915 | 508,574 | 344,216 | 50,157 | ..... |
| 1952 | | | | | | | | | | |
| Jan. | 183,738 | 139,488 | 37,091 | 133,985 | 102,265 | 31,806 | 49,753 | 37,223 | 5,285 | 869,299 |
| Feb. | 174,626 | 133,602 | 31,719 | 125,484 | 94,969 | 28,251 | 49,142 | 38,633 | 3,468 | 856,872 |
| Mar. | 173,694 | 131,997 | 32,118 | 125,787 | 95,206 | 27,782 | 47,907 | 37,196 | 4,336 | 857,115 |
| Apr. | 175,075 | 134,325 | 33,549 | 126,628 | 97,128 | 29,798 | 48,447 | 37,654 | 3,751 | 842,970 |
| May | 173,635 | 132,129 | 35,227 | 125,309 | 95,816 | 30,995 | 48,326 | 37,129 | 4,223 | 804,695 |
| June | 141,628 | 114,410 | 30,455 | 101,850 | 84,388 | 26,815 | 39,778 | 30,818 | 3,640 | 846,459 |
| July | 119,036 | 97,633 | 20,752 | 81,576 | 67,600 | 18,694 | 37,460 | 30,329 | 2,058 | 855,046 |
| Aug. | 150,232 | 113,997 | 24,498 | 107,203 | 80,877 | 21,626 | 43,029 | 33,120 | 2,872 | 809,354 |
| Sept. | 158,392 | 121,402 | 20,686 | 109,011 | 82,557 | 17,843 | 49,381 | 38,845 | 2,843 | 781,929 |
| Oct. | 165,155 | 124,626 | 23,590 | 116,201 | 86,584 | 20,611 | 48,954 | 38,042 | 2,979 | 772,949 |
| Nov. | 148,259 | 110,467 | 23,148 | 105,314 | 77,528 | 20,681 | 42,945 | 32,939 | 2,467 | 751,687 |
| Dec. | 161,733 | 122,166 | 26,728 | 114,146 | 85,809 | 24,046 | 47,587 | 36,357 | 2,682 | 719,203 |
| 12 mo. | 1,925,203 | 1,476,242 | 339,561 | 1,372,494 | 1,050,727 | 298,948 | 552,709 | 428,285 | 40,604 | ..... |

[1] Source: Bureau of Census. [2] All cast iron pipe is shipped for sale. [3] For sale only.

(Concluded on page 134)




## Index of Foundry Equipment Orders

**Foundry Trades Only**

(Net Orders Closed, New Equipment)

| | 1952 | 1953 |
|---|---|---|
| Jan. | 404.5 | 301.0 |
| Feb. | 200.4 | .... |
| Mar. | 310.0 | .... |
| Apr. | 385.1 | .... |
| May | 225.2 | .... |
| June | 353.8 | .... |
| July | 343.9 | .... |
| Aug. | 311.6 | .... |
| Sept. | 365.9 | .... |
| Oct. | 335.8 | .... |
| Nov. | 258.1 | .... |
| Dec. | 343.3 | .... |

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

## Ingot Brass and Bronze

(Shipments in net tons)

| | 1951 | 1952 |
|---|---|---|
| March | 31,997 | 23,890 |
| Apr. | 30,472 | 22,547 |
| May | 33,267 | 21,740 |
| June | 33,817 | 21,274 |
| July | 32,016 | 18,947 |
| Aug. | 25,285 | 21,807 |
| Sept. | 22,285 | 22,770 |
| Oct. | 23,124 | 25,811 |
| Nov. | 23,544 | 23,441 |
| 11 mo. | 311,391 | 243,753 |
| 12 mo. | 332,378 | ..... |

## Zinc-Base Alloy

(Shipments of castings—1000 pounds[1])

| | Shipments—Totals | Shipments—For Sale | Unfilled Orders[2] |
|---|---|---|---|
| 1950 | 579,332 | 376,681 | ..... |
| 1951 | | | |
| Sept. | 34,749 | 22,642 | 81,539 |
| 9 mo. | 390,954 | 261,389 | ..... |
| Total | 494,950 | 328,183 | ..... |
| 1952 | | | |
| Apr. | 37,312 | 23,741 | 63,753 |
| May | 35,775 | 22,410 | 62,397 |
| June | 33,829 | 21,433 | 60,719 |
| July | 23,462 | 16,055 | 57,666 |
| Aug. | 29,955 | 18,794 | 57,373 |
| Sept. | 38,092 | 24,460 | 61,669 |
| 9 mo. | 305,842 | 198,316 | ..... |

## Coke Production and Consumption

(Net tons)

| | Production | Consumption Total | Consumption By Foundries |
|---|---|---|---|
| 1950 | 72,718,038 | 73,373,618 | 3,522,396 |
| 1951 | 79,133,744 | 78,868,124 | 3,664,404 |
| 1952 | | | |
| Jan. | 6,804,106 | 6,760,011 | 261,148 |
| Feb. | 6,358,715 | 6,411,905 | 251,125 |
| Mar. | 6,779,639 | 6,743,944 | 264,488 |
| Apr. | 5,806,153 | 5,770,711 | 261,972 |
| May | 5,961,757 | 5,882,713 | 253,605 |
| June | 2,472,940 | 1,772,203 | 219,909 |
| July | 2,376,019 | 1,621,308 | 166,377 |
| Aug. | 6,039,749 | 6,204,539 | 232,249 |
| Sept. | 6,180,804 | 6,517,682 | 269,029 |
| Oct. | 6,449,519 | 6,792,273 | 276,427 |
| Nov. | 6,316,660 | 6,418,639 | 252,805 |
| Dec. | 6,690,649 | 6,981,036 | 246,107 |
| Total | 68,236,710 | 67,876,964 | 2,955,241 |
| 1953 | | | |
| Jan. | 6,763,204 | 6,880,344 | 248,314 |

## Pig Iron Production and Consumption

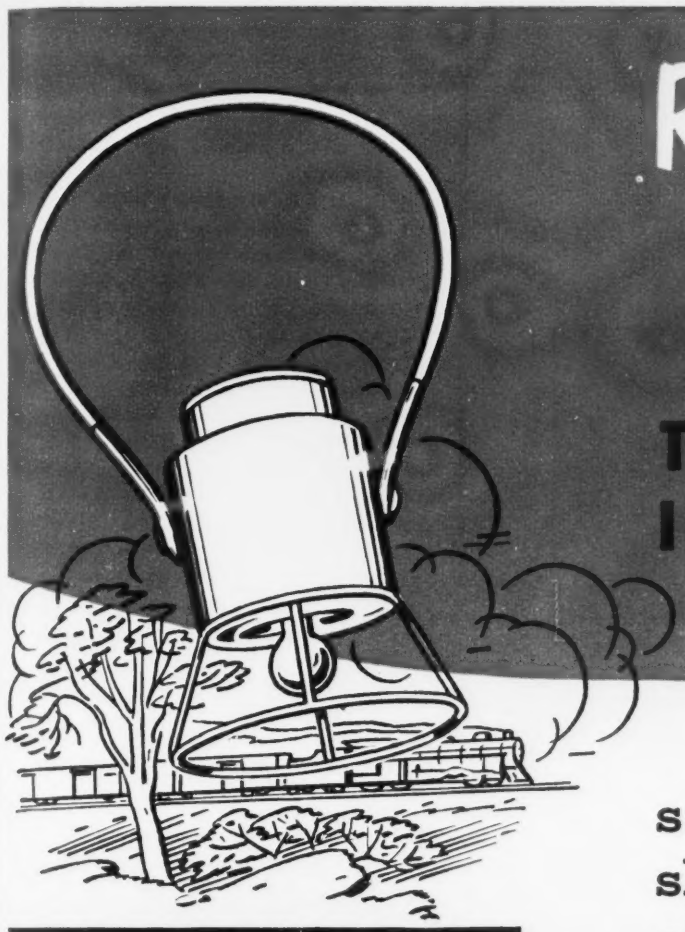
| | Production** (Standard grades—1000 net tons) Total | Foundry | Malleable | Basic | Low Phos. Intermediate Low Phos. & Bessemer | Consumption* (By type of furnace, 1000 gross tons) Total | Cupola | Air | Electric |
|---|---|---|---|---|---|---|---|---|---|
| 1950 | 64,589.1 | 2,870.4 | 3,034.2 | 50,450.5 | 8,234.0 | 58,416 | 5,475 | 319 | 326 |
| 1951 | 70,264.5 | 3,186.2 | 3,169.0 | 55,134.1 | 8,774.8 | 63,760 | 5,731 | 354 | 136 |
| 1952 | | | | | | | | | |
| Jan. | 5,964.3 | 233.1 | 285.8 | 4,672.3 | 733.1 | 5,452 | 466 | 29 | 14 |
| Feb. | 5,701.8 | 245.2 | 261.4 | 4,496.9 | 698.3 | 5,139 | 441 | 29 | 11 |
| Mar. | 6,226.2 | 250.3 | 273.1 | 4,895.9 | 806.9 | 5,552 | 433 | 27 | 7 |
| Apr. | 5,170.0 | 243.8 | 218.5 | 4,069.9 | 638.0 | 4,714 | 446 | 28 | 8 |
| May | 5,414.2 | 245.4 | 236.0 | 4,295.6 | 637.2 | 4,823 | 412 | 25 | 8 |
| June | 1,043.2 | 133.7 | 103.1 | 758.6 | 47.7 | 991 | 342 | 20 | 5 |
| July | 981.6 | 119.7 | 118.3 | 712.9 | 30.7 | 845 | 250 | 12 | 8 |
| Aug. | 5,767.3 | 262.9 | 280.6 | 4,553.8 | 669.9 | 5,063 | 423 | 9 | 8 |
| Sept. | 6,069.3 | 294.7 | 306.6 | 4,757.0 | 710.9 | 5,363 | 417 | 21 | 9 |
| Oct. | 6,415.3 | 280.0 | 299.4 | 5,091.6 | 744.2 | 5,812 | 463 | 24 | 9 |
| Nov. | 6,138.9 | 262.0 | 315.4 | 4,842.6 | 718.8 | 5,471.7 | 396.9 | 21 | 12 |
| Dec. | 6,414.7 | 293.4 | 315.1 | 5,106.9 | 699.2 | .... | .... | .... | .... |
| Total | 61,306.8 | 2,864.2 | 3,013.3 | 48,254.0 | 7,174.9 | .... | .... | .... | .... |
| 1953 | | | | | | | | | |
| Jan. | 6,470.6 | 274.9 | 285.5 | 5,201.5 | 708.8 | .... | .... | .... | .... |

## Iron and Steel Scrap Consumption

(Gross tons*)

| | All Scrap Total | All Scrap Purchased | By Types of Furnace: Cupola Total | Cupola Purchased | Air Total | Air Purchased | Electric Total | Electric Purchased |
|---|---|---|---|---|---|---|---|---|
| 1950 | 61,497,000 | 29,403,000 | 9,474,000 | 4,666,000 | 1,118,000 | 407,000 | 6,385,000 | 3,828,000 |
| 1951 | | | | | | | | |
| Nov. | 5,596,368 | 2,699,556 | 847,991 | 451,591 | 90,302 | 33,795 | 738,589 | 489,999 |
| 11 mo. | 63,035,119 | 31,165,895 | 10,356,457 | 5,480,401 | 1,115,992 | 408,669 | 7,704,360 | 5,038,850 |
| Dec. | 5,483,089 | 2,656,536 | 738,150 | 398,538 | 87,748 | 32,430 | 687,559 | 450,153 |
| Total | 68,518,208 | 33,822,431 | 11,090,607 | 5,878,939 | 1,203,740 | 441,099 | 8,391,919 | 5,389,003 |
| 1952 | | | | | | | | |
| Jan. | 5,847,011 | 2,788,426 | 846,891 | 449,935 | 101,211 | 38,150 | 743,233 | 470,126 |
| Feb. | 5,572,506 | 2,702,092 | 789,293 | 419,279 | 94,900 | 35,536 | 697,319 | 440,323 |
| Mar. | 5,902,529 | 2,860,364 | 791,165 | 415,853 | 92,751 | 35,013 | 741,793 | 475,161 |
| Apr. | 5,360,417 | 2,657,926 | 834,066 | 440,035 | 106,059 | 38,888 | 684,318 | 427,339 |
| May | 5,369,258 | 2,660,471 | 779,436 | 404,899 | 94,597 | 35,966 | 700,617 | 455,460 |
| June | 2,048,951 | 1,169,102 | 719,739 | 374,127 | 82,357 | 30,412 | 285,596 | 173,740 |
| July | 1,965,007 | 1,156,296 | 524,651 | 278,750 | 52,999 | 19,733 | 364,536 | 244,944 |
| Aug. | 5,470,696 | 2,738,593 | 721,255 | 348,181 | 74,351 | 28,091 | 682,405 | 448,543 |
| Sept. | 5,782,986 | 2,862,994 | 760,092 | 389,910 | 82,212 | 30,493 | 761,795 | 501,602 |
| Oct. | 6,256,031 | 3,066,041 | 851,458 | 439,401 | 98,947 | 37,743 | 814,565 | 546,189 |
| Nov. | 5,960,435 | 2,885,008 | 731,825 | 379,950 | 80,228 | 30,502 | 780,042 | 518,329 |
| 11 mo. | 55,535,827 | 27,547,313 | 8,349,871 | 4,340,320 | 960,612 | 360,527 | 7,256,219 | 4,609,749 |

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only.

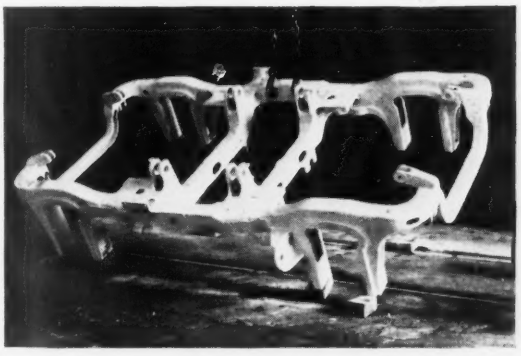


# Railroads are particular!

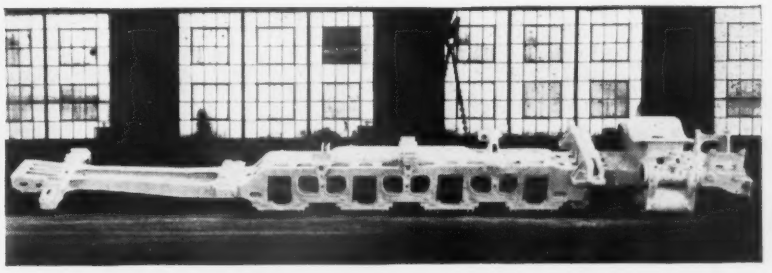
## They require SOUND, INTRICATE castings

*and*

## sound castings require skill, plus . . . the BEST of Materials!



A cast steel 4-wheel truck frame used on railway passenger cars where soundness is a must!



Cast steel locomotive bed made by General Steel Castings Corporation, Granite City, Illinois, another American Silica sand user.

## ..THAT MEANS...Sand from AMERICAN SILICA

It takes great technical skill all the way from the pattern shop to the cleaning room to produce intricate castings like these made by General Steel Castings Corporation. They must meet the rigid purchasing specifications of the American railroads.

There's another important factor, too. It takes top quality materials to produce perfect castings. The sand used must be carefully chosen to be sure it is backed by exacting quality control. That's one of the reasons why General Steel Castings Corporation of Granite City, Illinois, uses sand from the American Silica Sand Company.

You can safely rely on the quality control behind sand from American Silica. And don't forget the free technical service offered by their traveling sand technicians!

American
Silica Sand Co.
OTTAWA, ILL.

**Suppliers of: Crude and dried crude silica sand • *SULTRON*® flux • Australian zircon sand • Zircon flour**

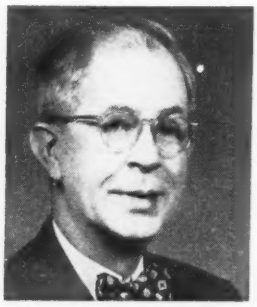
®*SULTRON* is the trademark of Westvaco Chemical Division, Food Machinery and Chemical Corporation, for its brand of sodium sequicarbonate

# MAN-TO-MAN

## on the Molder's Bench

### "Public Relations"

By RALPH L. LEE



FROM what I read in the business papers, public relations seems to be working its way up to a positon of A1 concern among business people. As president of the Lee Hobby Foundry, I got quite a jolt the other day when I read of a public relations program recommended for business concerns, both large and small. By actual count there were 12 major sections to this program and almost as many details in each section. Everything from smoke abatement, landscape gardening, factory visits, club memberships, speeches, radio, church attendance and interest in civic affairs was covered. And I must say there wasn't one item that a person wouldn't be inclined to nod his head to.

The thing that gave me a jolt, though, was that I couldn't see how anyone would have time enough left from such a program to turn out a few castings. Just a couple of weeks ago we took a Boy Scout troop through the plant and put on a demonstration for them, and I'll swear it knocked the spots out of two days.

I realize, of course, that the program was sort of a mark to shoot at, or, rather an outline of principles which would have to be tailored to fit different organizations, and that the main idea was that most of us need to pay a lot more attention to our relations with the public than we have in the past. Then, too, I seemed to read a warning between the lines that with recent elections hinting that business is partly out of the doghouse, we'd better watch our step down this new "no deal" path, lest our cockiness push us right back in again, deeper than ever.

It happens that for 15 years before I began putting full time in the Lee Hobby Foundry, I drew my pay under the banner of public relations; so I have seen a lot of water go over the dam. Although I'm not sure that even with all this background I could give a short, snappy definition of what public relations *is*, I'll bet I could do a pretty good job of explaining what public relations is *not*.

Since there seems to be no question that we all have to be more concerned with the subject from here on out, it occurred to me that it might be helpful if I shared with you my discoveries as to what public relations is not.

For one thing, I know for a fact that public relations is not a slick scheme for making the public think more of us than we darned well know we deserve; in fact, from what I have seen (plenty), public relations is not an activity at all. It's a *situation*. It's the shape a reputation is in. It's what people who do business with any of us think of us as a result of their dealings with us, or how people who have never met us feel toward us as a result of what they have heard about us.

So regardless of what we think, we have public relations whether we want them or not, whether we're companies, departments or individuals. And public relations have one whale of a lot to do with our business.

From what I've seen, during the past 15 years, of organizations trying to get out of the doghouse or to make unearned friends by influencing people on a mass production basis under the guise of public relations, a number of age-old bromides rear up and scream for attention.

1. Self praise stinks.

2. What you are speaks so loudly I can't hear what you say.

3. If you try to make an impression, that's exactly the impression you make.

It strikes me that before we hire a public relations manager or make any other move toward campaigning in this vague new field, it might be a good idea for us to decide just who our public is.

Probably the best place to start would be with our customers. The way they feel toward us as a result of their dealings with us and what they tell others are probably the most powerful public relations forces we have to deal with. What our customers say about us when our name is mentioned is worth more than the most costly and elaborate publicity programs we can cook up. The old grapevine is a two-way circuit for good or bad.

We don't need much of a program to see to it that every contact a customer makes with us does more good than harm, whether it's contact by personal call, by phone or by mail with salesman, accountant, shipping clerk, order clerk, patternmaker, superintendent or trucker.

Then there's another, influential section of the public—the peddlers or, to put it more politely, our suppliers. They sure do get around, and they aren't what you'd call tongue-tied. What this means is that our purchasing agent, or for that matter any one who buys from or otherwise contacts the peddlers, is our public relations manager for this sector of our public, whether he realizes it or not.

One important section of the public calls at the front office, all mixed up together, and its members aren't unscrambled or identified until they are processed through the receptionist or whoever serves her function. Man oh man, what a strategic post *this* is from a public relations standpoint! One of the best regarded organizations I have ever heard of, a pioneer in recognizing public opinion as a powerful business force, took as much care in selecting its receptionist as in selecting its sales manager.

Maybe the receptionist, or her equivalent, also answers the phone. If all the incoming and outgoing calls made each day were multiplied by the number of business days in the year, we wouldn't have to use much imagination to discover in the telephone one of the most powerful public relations blasters or boosters

(*Concluded on page* 138)

# DETROIT...

## *foundry market area number four*

The Detroit foundry market area, fourth in number of employees with just over 20,000, and fifth in number of foundries with 143, is nevertheless second in production—better than a million tons per year. Automotive castings, of course, make up the biggest part of the production in this market, which is noted for its many fully-mechanized, high-production foundries. Of the 52 gray iron foundries in the Detroit area, quite a good percentage use ANNEALSHOT and/or SUPER-ANNEALSHOT, and obtain excellent results at low cost. For information on these better abrasives, write **Metal Blast, Inc.,** 872 East 67th St., Cleveland 3, Ohio.

Statistics from Penton's HOW TO SELL THE FOUNDRY MARKET

*The famous Ford Rotunda, containing executive offices and the reception center for visitors of the Ford Motor Company.*

Detroit Convention & Tourist Bureau Photo

**ANNEALSHOT**
chilled shot and grit

**SUPER-ANNEALSHOT**
malleable shot and grit

GUARANTEE: *If you don't find Metal Blast abrasives the best and most economical you've ever used—you may return the unused quantity for refund, at our expense.*

(*Concluded from page* 136)

we have under our control.

As part of other organizations' public, we know from experience that sometimes our relationships with them can be strained to the breaking point by some of the letters we receive. A review of the correspondence leaving our place under our company letterhead could be an eye-opener from a public relations standpoint.

But probably the most powerful factor in the relationship we have with our public, and particularly with that portion most responsible for New Deals, Fair Deals and No Deals, is our employees. The way they feel toward us as a result of living with us day in and day out is vital, to say the least.

Just picture each one, from bookkeeper to handyman, going home at night and telling his wife, kids, relatives, neighbors, storekeepers, preacher, mail man and milkman about the outfit he works for.

Then picture each of these listeners, if the morsel is juicy enough, passing it along with a few twists of his own. Talk about direct mail, full-page spreads, speeches and what have you! Word of mouth has been proved by costly research to be the most powerful force yet discovered in molding public opinion.

Before we leave the employees, there is a similar, all-fired important block of our public—the folks who come to us for jobs when there aren't any. I have often thought that it would be amazing if we found out what percentage of the wage-earning public in our communities files through our employment offices over a period of time, unsuccessfully searching for jobs, and how they feel toward the company as a result of their experience.

I didn't mean to get into this public relations maze so deeply when I started out. But in a way I am glad I did, if for no other reason than to prove that no matter how complicated it seems to be while reading about it, public relations is as simple as rolling off a log when we realize that it's got to start inside the plant and that when all is said and done, it's nothing more than common, ordinary, everyday good manners at every point of contact, within the plant and office and out.

I hope I haven't given the impression that I am making fun of the 12-point public relations program I read about, for I am not. But I do want to make the point that you could go through all of the motions recommended by it without getting to first base if the internal relationships we've been talking about were far enough from what they should be. I am sure that a mutually satisfactory public relations job can't be done on a mass-production basis or a contract basis. It's got to be done working man *by* man and man *to* man.

## Book Review

*Wood Chemistry,* edited by Louis E. Wise and Edwin C. Jahn, 2nd edition, 2 vols., 688 pages each, 6 x 9 in., published by Reinhold Publishing Corp., New York. Price $15 per volume.

Expanded into two volumes in the second edition, this work fully describes the basic chemistry underlying important processes and products employing wood or wood chemistry.

Many chapters are entirely new, and some which appeared in the first edition have been completely rewritten to bring them up to date. Many special topics not normally covered in such a collection are thoroughly covered.

Volume I deals with the growth, anatomy and physical properties of wood; the components and chemistry of the cell wall and the extraneous components of wood. Volume II discusses the surface properties of wood and its chemical utilization, biological decomposition and chemical analysis.

## Training Film Portrays Industrial Truck Safety

A new training and safety film produced for industrial truck operators by the Clark Equipment Co., Battle Creek, Mich., illustrates the "do's and don'ts" of safe driving, including the causes of most truck accidents and how they can be avoided. The 30-minute sound movie, entitled "Safety Saves," was filmed at on-the-job factory and warehouse locations and covers operation of fork trucks, towing tractors and hand trucks.

Reported to be the only training film of its kind, "Safety Saves" is available on a loan basis. For a reservation form, write to the Clark Equipment Co., Industrial Truck Division, Battle Creek, Mich.

## Meetings of Interest to Foundrymen

**Apr. 9-10—Malleable Founders' Society,** fourth annual market development conference, Illinois Institute of Technology, Chicago

**May 1, 1953—American Association of Spectrographers,** symposium, Chicago

**May 4-8—American Foundrymen's Society,** annual convention, Chicago

**May 18-22—Material Handling Institute,** fifth national materials handling exposition, Convention Hall, Philadelphia

**May 20-22—Society for Experimental Stress Analysis,** spring meeting, Hotel Schroeder, Milwaukee

**June 8-10—Malleable Founders' Society,** annual meeting, Homestead, Hot Springs, Va.

**June 29-July 3—American Society for Testing Materials,** annual meeting, Chalfonte-Haddon Hall, Atlantic City

**Sept. 17-18—Western New York Regional Foundry Conference,** sponsored by Western New York Chapter of the AFS, Buffalo

**Sept. 19-26 — International Committee of Foundry Technical Associations,** annual foundry congress, Paris, France

**Sept. 21-22—Steel Founders' Society,** fall meeting, Homestead, Hot Springs, Va.

**Sept. 21-25—Instrument Society of America,** national congress and exhibit, Sherman Hotel, Chicago

**Sept. 24-25 — Ohio Regional Foundry Conference,** sponsored by University of Cincinnati and Ohio AFS Chapters, Cincinnati

**Oct. 8-9—Gray Iron Founders Society,** annual meeting New Hotel Jefferson, St. Louis

**Oct. 8-9—Michigan Regional Foundry Conference,** Kellogg Center, Michigan State College, East Lansing, Mich.

**Oct. 15-17—Foundry Equipment Manufacturers' Association,** annual meeting, Greenbrier, White Sulphur Springs, W. Va.

**Oct. 19-23—American Society for Metals,** national metal congress and exposition, Public Auditorium, Cleveland

# *New Model M-WC Water-Cooled* CENTRIFUGAL CASTING MACHINE

**Write for Bulletin #153**

The water-cooled Model M-WC centrifugal casting machine utilizes low-cost permanent molds, producing gray cast iron cylinder liners, bushings, etc., at a high rate. With water-cooled metal molds it is possible to produce gray, machineable cast iron using ordinary metal analyses. This is accomplished easily in the water-cooled Model M-WC because mold temperature can be maintained at any high or low temperature merely by controlling the amount of water used for cooling. Use of a properly applied refractory wash and a hot mold permits facile production of completely gray cast iron bushings, even at the ends.

*Model M-WC is also ideal for either high or limited production of bronze bushings, with the same advantages of low-cost molds and ease of changing molds.*

## FEATURES

- **Low mold cost for either cast iron or bronze castings.**
- **High production—only one mold necessary.**
- **Simple, sturdy equipment—practically no maintenance.**
- **Quick changeover from one mold size to another.**
- **Rapid initial production as molds are made from available steel tubing—eliminating pattern expense and delay for casting of molds.**
- **Very small floor space required.**
- **Machine completely guarded and safe for workmen.**
- **Only unskilled labor required.**
- **Mold operating temperature easily controlled.**

## RESEARCH FACILITIES

We have available an Experimental Foundry equipped for ferrous and non-ferrous melting for both vertical and horizontal centrifugal casting production. Our facilities are available to foundries for research or trial centrifugal casting at low cost.

**CENTRIFUGAL CASTING MACHINE COMPANY**

P. O. BOX 947 TULSA 1, OKLAHOMA

**PRODUCE GRAY CAST IRON CYLINDER LINERS**

**AND**

**BRONZE BUSHINGS**

**RAPIDLY AND AT LOW COST**

**BY CENTRIFUGAL CASTING**

Bridges over the Chicago river swing open to permit passage of the *Cliffs Victory*, largest ore carrier on the Great Lakes *(Acme Photo)*

# CHICAGO *To Be Host to* AFS NATIONAL CONVENTION

FOR the first time since 1940 Chicago Chapter of the American Foundrymen's Society will be host to the annual convention of the society May 4-8. Various arrangement details, including plant visitations and social functions of this 57th annual meeting are nearing completion under the direction of the chapter's General Convention Committee.

Heading this committee are: Chairman—Fred B. Skeates, Link-Belt Co., Chicago; co-chairman — John H. Owen, Harbison-Walker Refractories Co., Chicago; vice chairman—John A. Rassenfoss, American Steel Foundries, East Chicago, Ind.; secretary—Robert L. Doelman, Miller & Co., Chicago, and treasurer—James T. Moore, Wells Mfg. Co., Skokie, Ill.

Registration and most of the sessions will be held at the Sherman Hotel. However, the practice of advance registration, started two years ago for the convenience of those attending the convention, is expected to facilitate handling the increased attendance anticipated as a result of the expanded five-day program.

Fifty-two technical sessions already are scheduled. Two symposiums are included: One, dealing with sand reclamation, will cover various types of reclamation equipment currently in operation. Two sessions are scheduled for May 6. The other, sponsored by the Plant and Plant Equipment Committee, will broaden last year's popular meetings into the field of coremaking equipment. Sessions are scheduled for the afternoon and evening of May 7.

Luncheon roundtable meetings include: Light Metals, May 4—"Shell Molding" or "Surface Finishes;" Brass and Bronze, May 5—Discussion of prepared questions solicited from AFS chapters; Malleable, May 5—To be announced; Pattern, May 6—"Questions and Answers;" Gray Iron, May 7—"Scrap Reduction;" and Steel, May 7—"Hot Tearing." The Education Division will hold its customary dinner May 5.

Eight Shop Courses are scheduled for evening presentation to accommodate operating men who may not be able to attend daytime sessions. The Gray Iron Shop Course, to be held on May 4, 5 and 7, features: "Gating, Risering, and Pouring and Their Relation to Scrap." "Chill Control," and "Carbon Control in the Cupola."

Sand Shop Course meetings on the same evenings cover: "Pinholes in Castings," "Evaluation of Molding Processes—Green Sand, Permanent Mold, Die Casting, Shell Mold, Core Sand, and Dry Sand," and "Mulling Techniques in Relation to Casting Quality." Discussion topics are yet to be announced for the Brass and Bronze Shop Course which is to be held May 4-5.

Titanium melting and casting are dealt with in several papers at sessions sponsored by the Light Metals Division. This will be the first time that a discussion of titanium has been included in an AFS convention program.

Convention social events are grouped in the middle three days of the week. AFS President I. R. Wagner, Electric Steel Castings Co., Indianapolis, will preside at the annual banquet May 6 and at the annual business meeting the following day. At the meeting Mr. Wagner will give the presidential address, and election of officers and directors and presentation of apprentice contest awards will take place. James H. Smith, Central Foundry Division, General Motors Corp., Saginaw, Mich., will give the Charles Edgar Hoyt Annual Lecture following the business meeting. The Canadian dinner is scheduled for May 5; past AFS presidents will hold their annual breakfast on May 6, and the AFS Alumni Dinner is May 7.

Gold medals and honorary life memberships will be awarded at the banquet to the following: **William J. Grede,** Grede Foundries Inc., Milwaukee, the William H. McFadden Gold Medal "for outstanding public service bringing great credit upon and broad recognition for the entire foundry industry."

**Daniel E. Krause,** Gray Iron Research Institute, Columbus, O., the John H. Whiting Gold Medal "for outstanding contributions to the society and the foundry industry in the field of ferrous metallurgy and research."

**William Romanoff,** H. Kramer & Co., Chicago, the Joseph S. Seaman Gold Medal "for exceptional contributions to the society and its Brass and Bronze Division over many years."

**James H. Smith,** the Peter L. Simpson Gold Medal "for outstanding contributions to the application of engineering principles in foundry practice, and as the 1953 Charles Edgar Hoyt Annual Lecturer."

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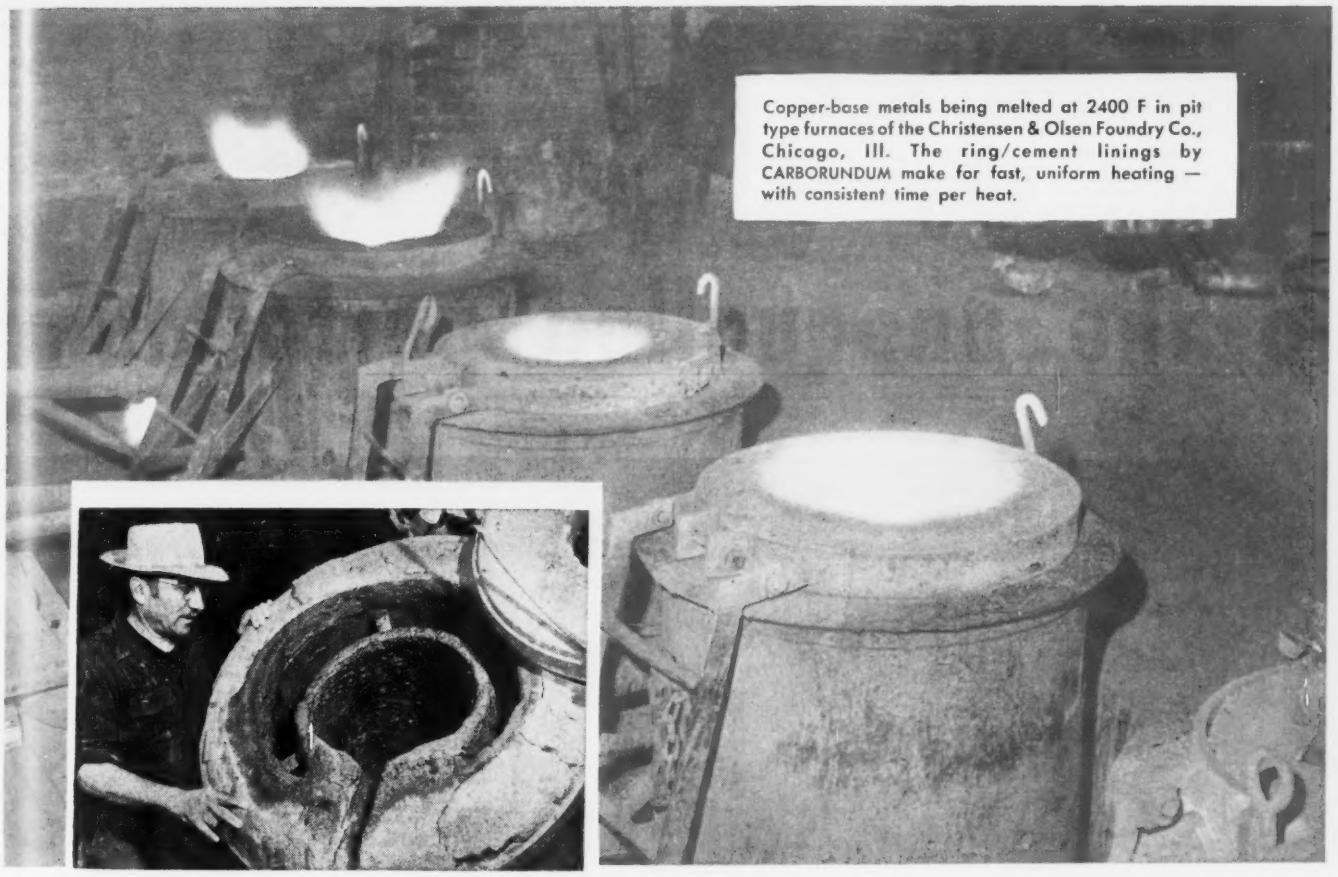


Copper-base metals being melted at 2400 F in pit type furnaces of the Christensen & Olsen Foundry Co., Chicago, Ill. The ring/cement linings by CARBORUNDUM make for fast, uniform heating — with consistent time per heat.



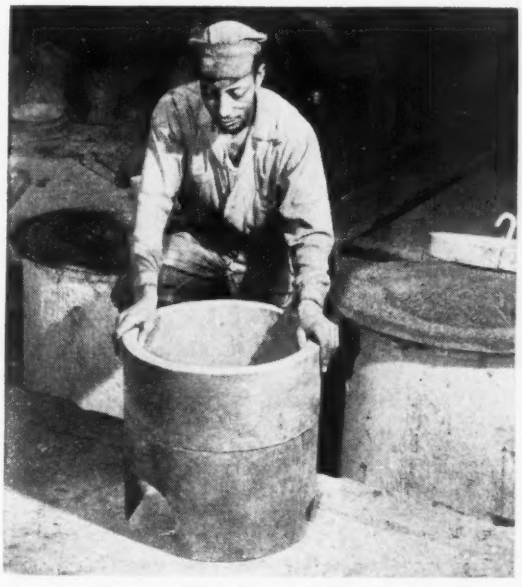
Rudolph Buchhaass examines tilting-furnace lining. The ALFRAX castable cement that backs up the 1¾" thick ring segments is one of the best refractory insulating materials available. It makes a low-heat-capacity furnace and keeps heat loss to a minimum. It's also easy to handle — just mix with water and pour.

# "These linings last 2 years"

## reports non-ferrous foundry

This Illinois foundry, specializing on copper-base castings, has 10 crucible furnaces — six of the pit type and four tilters. They melt up to 30,000 pounds in a nine-hour day. All have linings made by CARBORUNDUM consisting of complete rings or segmental tile of CARBOFRAX silicon carbide refractory that are backed up with 2½" or more of ALFRAX aluminum oxide castable cement (used for insulation).

"These linings," says the operator, "play a big part in keeping our melting costs so low — as low as any in the area. They are *the* best for this type of work. A complete lining takes only a couple of hours to install, and barring accidents, is good for about *two years*."



New, one-piece CARBOFRAX rings of the type used in the pit-type furnaces. As you can see, the 1½" thick rings are light enough for one man to handle. No hoist is needed to install them. This refractory is highly resistant to flame erosion, spalling, and cracking — it won't soften even at 3000 F or more.

**For full information** on our rings, ring segments, and cements, address Dept. A-43 Refractories Div., The Carborundum Co., Perth Amboy, N. J. We make lining materials to fit every need, and will gladly furnish specific recommendations. No obligation, of course.

# CARBORUNDUM

Trade Mark

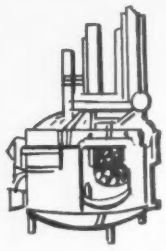
*"Carborundum," "Alfrax," and "Carbofrax" are registered trade marks which indicate manufacture by The Carborundum Co.*

# CONTROL

## to the unequalled performance

**THESE CHECK POINTS GUARANTEE THE PERFORMANCE OF WHEELABRATOR® STEEL SHOT**

### MELTING

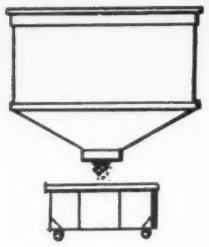


- ✓ **1.** Rigid scrap selection.
- ✓ **2.** Preliminary carbon and manganese analysis.
- ✓ **3.** Complete chemical analysis.

### POURING

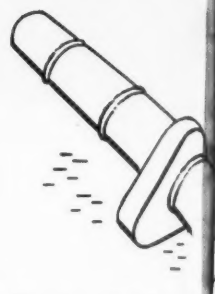
- ✓ **4.** Accurate and continuous control of pouring temperature.
- ✓ **5.** Accurate and continuous control of quench temperature.

### FIRST SCREENING



- ✓ **6.** Visual and metallographic inspection in as-cast condition.
- ✓ **7.** Hardness check in as-cast condition.
- ✓ **8.** Continuous inspection of screening operation.

### DRYING and SHOT CONDITIONING



- ✓ **9.** Recording temperature control.
- ✓ **10.** Removal of objectionable material.

How many perfect castings do you make in a hundred million pieces? One average shipment of shot, either iron or steel, contains that many individual castings. The greater percentage of imperfect castings it contains, the faster it breaks down and requires replacement. Even slight variations in structure or hardness can have a tremendous effect on cleaning costs.

After years of research, *American* has developed and patented a method for producing shot with an absolute minimum number of defective pellets. It took a new plant and new production methods in order to achieve this quality, and there are 19 CONTROL CHECKS to see that it is maintained.

This new "Wheelabrator" Steel Shot is made of the finest electric furnace steel which is heat treated to a tempered Martensite micro-structure, the hardest and toughest of the iron carbon alloys. It is given a double heat treatment at automatically controlled temperatures to provide a new standard of toughness, solidity, uniformity and efficiency.

*FOR YOU this means less abrasive to buy, fewer machine parts to replace, less maintenance labor required and lower freight costs.*

*Bulletin 89 tells the complete story about "Wheelabrator" Steel Shot and what it means to the user in terms of performance and economy. Write for your copy today.*

**American**

**WHEELABRATOR & EQUIPMENT CORP.**

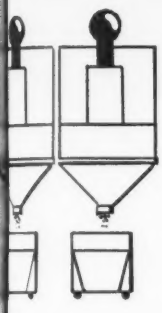
505 S. BYRKIT ST. MISHAWAKA, INDIANA

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

# is the key

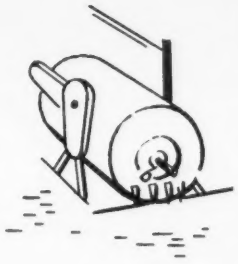
# of WHEELABRATOR® STEEL SHOT

## SECOND CREENING



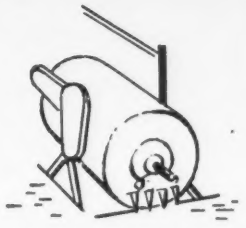
✓ Continuous inspection of screens.

## FIRST HEAT TREATING



✓ **12.** Automatic control and permanent record by recording instrument of heat treat time and temperature.

## SECOND HEAT TREATING

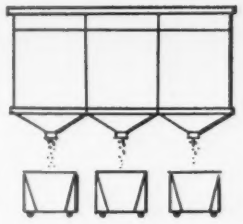


✓ **13.** Automatic control and permanent record by recording instrument of heat treat time and temperature.

✓ **14.** Continuous tests for hardness and carbon content.

✓ **15.** Continuous microscopic inspection.

## FINAL SCREENING



✓ **16.** Continuous inspection of screens and shot.

✓ **17.** Daily laboratory checks of screening accuracy.

## BAGGING

✓ **18.** Continuous inspection of shot.

✓ **19.** Daily shot breakdown tests.

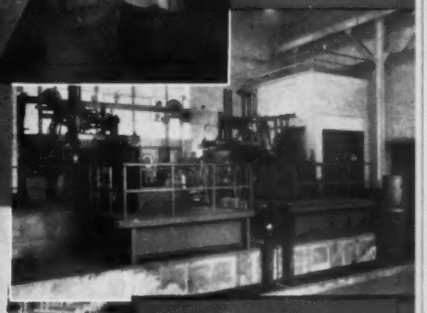
***took a NEW PLANT and NEW PRODUCTION ETHODS to produce this NEW SUPER RASIVE with the uniformity and structural ulities required for***

**MAXIMUM LIFE** ✓ **MINIMUM MAINTENANCE**
**FASTEST CLEANING** ✓ **LOWEST OPERATING COSTS**

provide this quality product for our customers, *American* has become the first and only manufacturer of blast equipment to d and operate its own shot producing plant, employing the st equipment, methods and controls.

name "Wheelabrator", proudly applied to this new steel , is *American's* assurance that you can use this abrasive with fidence in achieving improved performance and economy. Try oon.

Wheelabrator Steel Shot Laboratory conducts continuous control checks.



Electric arc furnaces insure accurate control of pouring temperature.

Automatically controlled heat treating equipment assures a non-varying metallurgical structure.

The building was designed for one purpose only — to produce the world's best abrasive.

(*Concluded from page 140*)

**George J. Barker,** University of Wisconsin, Madison, Wis., honorary life membership in the AFS "for outstanding contributions to the society and the castings industry in the education of young engineers for greater appreciation of the industry, the casting process and cast products as engineering materials."

**I. Richard Wagner,** Honorary Life Membership in the AFS "for outstanding service to the society as president during the year 1952-53."

Awards in the apprentice contest will go to winners in each of the five divisions: Metal patternmaking, wood patternmaking, and gray iron, steel, and nonferrous molding. A partial list of companies where chapter contests were held includes: Olney Foundry, Link-Belt Co., Philadelphia; Dodge Steel Co., Philadelphia; Brom Machine & Foundry Co., Winona, Minn.; Valley Iron Works Inc., St. Paul, Minn.; American Hoist & Derrick Co., St. Paul, Minn.; Brown & Sharpe Mfg. Co., Providence, R. I.; Whitin Machine Works, Whitinsville, Mass.; Caterpillar Tractor Works, Peoria, Ill.; U. S. Steel Corp., Chicago, and International Harvester Co., Tractor Works, Chicago.

AFS Chapters which sponsored apprentice contests will submit their winning entries in each division for national judging. They are: Birmingham District, Detroit, Eastern Canada plus the Three Rivers area and Sherbrooke area, Metropolitan, Michiana, Northeastern Ohio, Northern Illinois-Southern Wisconsin, St. Louis, Southern California and Wisconsin.

Other convention committees and their chairmen include: *Banquet* — J. C. Gore, Archer-Daniels-Midland Co., Foundry Products Division, Chicago. *Publicity*—W. D. McMillan, International Harvester Co., McCormick Works, Chicago. *Reception*—M. K. Wells, Wells Mfg. Co., Skokie, Ill. *Plant Visitation* — H. Kenneth Briggs, Miller & Co., Chicago. *Shop Course*—Harold G. Haines, Burke Industries, Chicago. *Ladies Entertainment*—Walter W. Moore, Burnside Steel Foundry Co.; Frank B. Flynn, S. Obermayer Co., co-chairman.

Chairwomen of the ladies' committees are: *Entertainment*—Mrs. B. C. Yearley. *Hospitality* — Mrs. C. V. Nass. *Registration*—Mrs. W. Moore, and *Program*—Mrs. R. P. Schauss.

## Society of Automotive Engineers Meets in East

The first Aeronautic Production Forum to be conducted in the East by the Society of Automotive Engineers will be held simultaneously at the Hotels Governor Clinton and McAlpin in New York on April 20, 1953.

The program is being arranged under the auspices of the SAE Production Activity Committee. Roy T. Hurley, chairman and president of the Curtiss-Wright Corp., is sponsor; Dr. Michael Field, a partner in the engineering firm of Metcut Research Associates, Cincinnati, is chairman.

The forum will cover 10 sessions on major subjects of importance to the aviation industry. The discussion in each will be conducted by a panel of industry experts. Subjects include large castings and forgings, experimental manufacturing, inspection and quality control, jet engine buckets and blades, machine tools and tooling, machining, manufacturing management, precision forming and joining, production procurement and titanium.

## Materials Handling Show Will Tour Country

Two giant tractors and trailers are carrying a traveling materials handling show assembled by Yale & Towne Mfg. Co., Philadelphia 15, on a tour that will cover 25,000 miles and last two years. The show will cross the continent twice and will appear in Canada and Mexico.

In addition to the company's materials handling equipment to be demonstrated, the show includes music and movie equipment, 100 lightweight armchairs for spectators, generators, battery chargers, promotional material and a 40 x 68 ft, fireproofed canvas canopy.

The staff responsible for the smooth running of the three-a-day, 40-minute shows and for meeting the tight caravan time schedule are all members of Yale & Towne.

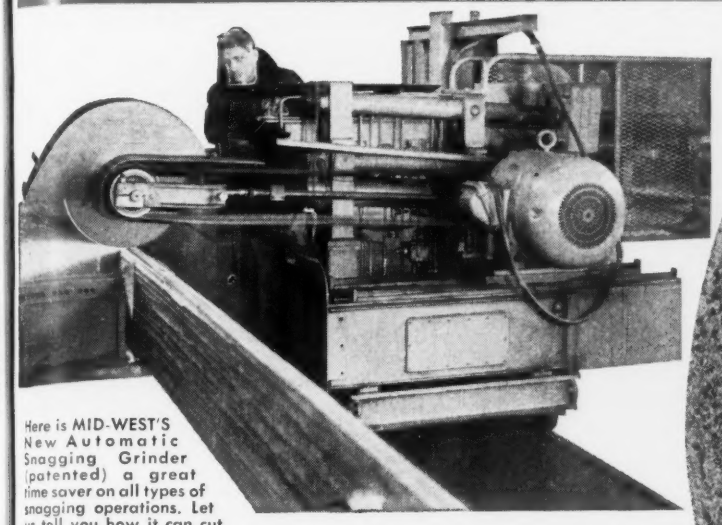
## Book Review

*ASTM Standards* 1952, *Part 4, Paint, Naval Stores, Wood, Sandwich Constructions, Building Constructions, Fire Tests,* cloth, 1152 pages, 6 x 9 in., published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3.

Containing 271 formally adopted standards as well as tentative specifications, methods of tests, etc. of the society, this volume is a triennial publication. Context is arranged in two-column form for easier reading. Printed on Bible paper, the volume is much less bulky than the number of pages would indicate. Contents are listed according to material as well as in numerical sequence. Subject index at back of the book aids in easy location of any standard since it is arranged under general subject matter.

"Are you haulin' scrap or dozin' snow?"

# GREATER PRODUCTION...



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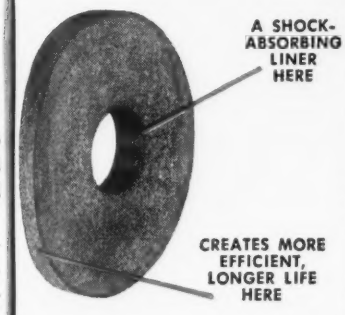


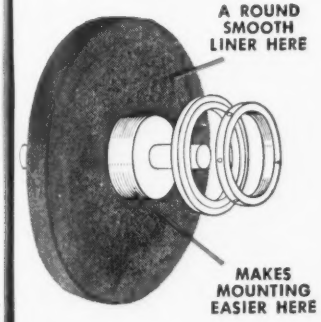


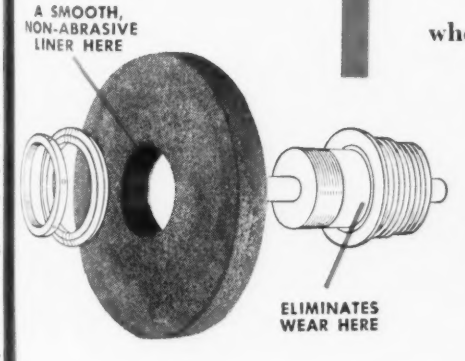


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**... and here are the reasons why they are better "on the job" wheels.**

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Not only will Mid-West Fiber-Cushioned resinoid snagging wheels minimize the troubles so characteristic of snagging operations, but they're easier to mount, they're stronger, and they last longer.

The fiber-cushioned centers plus Mid-West's special resinoid bond, an extremely cool cutting bond, assures a highly satisfactory wheel life and increased production.

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# AROUND THE COUNTRY

*News Reports from . . .*

GRAY IRON foundry operations still lag. Except for some foundries producing machinery castings, most plants have difficulty maintaining an average of more than four days a week operation. Some gray iron operators say they have experienced little if any increase since the first of the year. Spottiness also prevails at the brass and bronze shops. Were it not for operations at some of the captive nonferrous foundries, the overall average in this branch of the industry would be rather poor.

Malleable operators are doing none too well. While automotive requirements are fanning out from the automobile producing centers, they have made little impression on malleable casting sales in this district. Malleable foundries, almost without exception, can make fairly prompt deliveries.

Steel foundry operations are being well sustained, however, although more tonnage is being shipped than received in the form of new orders.

OPERATIONS at gray iron foundries are at least steady, but not at the level foundrymen had hoped for by this time. Shops are still averaging around 70 per cent of normal, with jobbing plants having little more than two weeks' backlog.

Requirements of machinery manufacturers are providing a lift in some cases—namely those of grinding machine builders. However, machine tool business itself has leveled off, with various manufacturers working off backlogs for which castings already have been supplied. Little further spurt in machinery casting demand is expected until machinery builders themselves experience renewed activity.

Pressure pipe foundries are a little more active and this trend should continue as the spring season gets under way. Soil pipe demand has not increased, but seasonal influences should have some effect upon this business also.

Defense work, which is rather negligible among the gray iron shops, has a continued strong influence on steel foundry operations. Trade estimates place defense work at around 50 per cent for most steel foundries. These plants are operating at virtually 100 per cent of normal, and while they still are eating into backlogs, they have much work on hand. Most foundries can work in tonnage for delivery within eight to ten weeks; however, they have enough business to run them solidly for much longer, if it were possible to thus consolidate schedules.

Despite increasing automotive requirements, which are reflected to some extent in this district, most malleable shops report a continued lag in business. In general, it would appear that their position is no better than that of the gray iron shops. Operations at some plants are averaging little better than four days a week and backlogs are light. In fact, it is a hand-to-mouth operation for some of them.

Barring principally aluminum and magnesium shops, nonferrous foundries are operating on a rather limited scale. Work at brass shops is spotty and in general involves little defense work, possibly not more than 10 per cent. This is in rather sharp contrast to the defense volume running through the white metal shops. Certain brass and bronze foundries specializing in maritime requirements, and this is linked up more or less with defense, are doing fairly well.

Pig iron supply is adequate for the most part. This is particularly true of foundry iron. Basic, though, is still on the stringent side and the overall picture hasn't been helped any by the suspension of operations at a stack in Steelton, Pa., for relining. Of academic interest to foundrymen in this district is the fact that Colorado Fuel & Iron Corp. still contemplates erection of a blast furnace at Claymont, Del. This proposed development first received public mention several months ago, but plans have been deferred for the time being while the corporation centers attention on the financing of its latest acquisition, the Roebling Co. properties.

Some foreign iron is coming in from time to time, mostly basic or other steelmaking grades, but little in the way of foundry iron. Supply has eased a bit on the other side but not sufficiently for foreign producers to become really competitive here. Standard foundry iron from Holland has been offered at around $59 to $60, duty paid, Philadelphia. But this is still above the domestic market, with Bethlehem quoting $57 base and Swedeland $59 base. Some German basic has been offered at around $63.25, duty paid, Philadelphia. This also is too high to attract the general run of buyers in this area.

PRESSURE is growing for higher foundry wages. A rash of labor disputes has already broken out affecting foundries of several stove manufacturers. The stoppages are not over higher wages but mainly involve fringe benefits. However, AFL unions have notified iron foundries locally that bargaining will begin in April for a 20-cent increase—as well as greater fringe benefits.

Foundry wages rose twice last year with two increases totaling 14 cents. A 5-cent general increase last month eased the situation a little more. However, local foundries may not be

(*Concluded on page* 148)

*the*

# Mathews Engineer brings you 47 years of experience in mechanized handling

In the highly-specialized field of modern conveyer system work, there is no substitute for experience. In Mathews equipment you get that experience, plus the engineering resources and production facilities of three modern plants. That's why we believe you get more for your money—better design—better performance—longer service—when you buy Mathews Foundry Conveyers. *Write today for Catalog 151.*

## MATHEWS CONVEYERS

**GENERAL OFFICES** . . . . . *Mathews Conveyer Company* . . . . Ellwood City, Pennsylvania
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**CANADIAN DIVISION** . . . . . *Mathews Conveyer Company, Ltd.* . . . . . Port Hope, Ontario

*Engineering Offices or Sales Agencies in Principal American and Canadian Cities*

(*Concluded from page 146*)

able to support much higher wage levels. Due to increased cost of materials and labor, foundry earnings last year were less than in 1951. For some, profits were off as much as 20 per cent. For the period from 1946 to 1951 earnings before taxes of gray iron shops were about 9 per cent. Foundrymen say they expect to realize smaller profit margins than that this year.

To discuss problems related to foundry management, local iron men have formed the Gray Iron Institute of Southern California. Attending the first meeting of the group last month were representatives of 22 local gray iron foundries. Al Renfrow of Renfrow Gray Iron Foundry is acting chairman, and Charles Gregg of Gregg Iron Foundry is acting secretary.

Raw material supply continues to improve. Lower activity of most foundries last month caused prices of No. 1 cupola cast to sag $3 to $41. Pig iron from the South Pacific regions, including New Zealand, is being offered at $60 per gross ton, about $5 less than from local domestic sources.

THEFTS of hard-to-get nonferrous metals and alloys from foundries in the Chicago district reached such proportions in early March that foundry owners and operators found it necessary to confer with police officials to focus attention on the serious situation and to arrange for better protection.

The conference with police was arranged by the Chicago Chapter of the Non-Ferrous Founders' Society, of which Fred Haack Jr., president of the Capital Brass & Aluminum Foundry Co., is the chairman. Chester Rachek of the Star Aluminum & Brass Foundry is co-chairman of the organization.

The depredations have been occurring for some time but seemed to become more numerous after the government began lifting controls on copper and aluminum recently. A similar series of thefts plagued the industry a year or so ago. Incidentally, the Milwaukee area has reported metal thefts too.

In some cases, the metal taken is in the form of finished parts ready for shipment to customers, but more often it is in ingot or scrap form. Quantities have been as high as 2½ tons and values have ranged up to $6000.

One foundry was robbed on the same evening that members of the Non-Ferrous Founders' Society were meeting to determine a course of action to get better police protection. There are reasons to believe that the thefts are engineered by organized gangs which facilitate their operations with special equipment.

In addition to foundries, metal spinning shops and electroplaters are victims of the thefts of scarce metals.

The police agreed to provide greater vigilance. To assist them in giving this better protection, the officers were given lists of foundries and other shops where the alert is to be maintained. These will receive special attention.

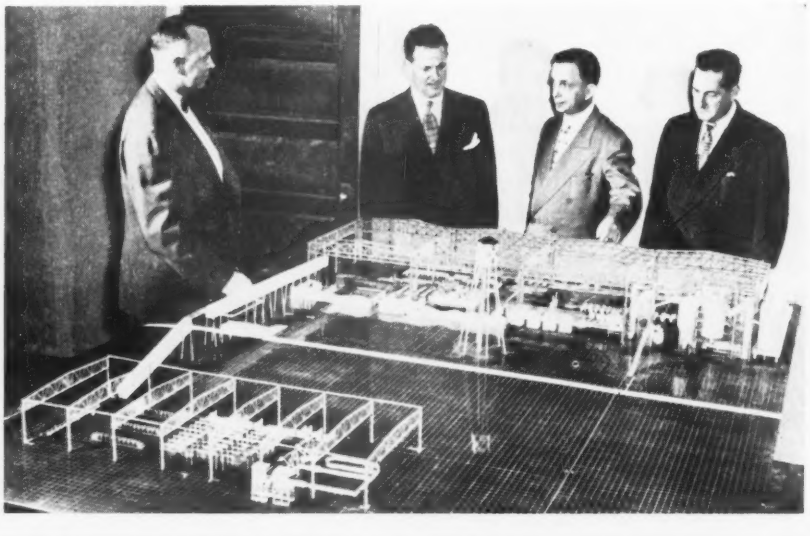
## Chrysler Is Building New Aluminum Foundry

Cylinder heads for air-cooled tank engines manufactured by Chrysler Corp. will be produced at a new aluminum foundry now being constructed at Michoud Ordnace Plant, New Orleans, under supervision of United States Army engineers. Lester B. Knight & Associates Inc., consulting engineers, Chicago, is the Corps of Engineers' representative doing engineering and architectural work and construction management. The foundry is expected to be in production next fall.

The completed foundry will be capable of pouring about 3 million pounds of aluminum per month. Foundry space is being provided by conversion of a flight hangar and a hammer shop plus new construction, including an addition for housing sand reclamation equipment, eight 600-ton capacity silos for storing core sand, and several smaller buildings for such uses as oil storage and acetylene generators.

Molding, coremaking, melting and shake out will be housed in the flight hangar, with cleaning, heat treating, testing and final inspection being performed in the adjoining old hammer shop. Most of the foundry equipment is being shipped from the Chicago plant where Chrysler built B-29 bomber engines during World War II.

The illustration shows a model of the plant built by Knight Models Inc. Left to right, are T. E. Gross, superintendent of Michoud Ordnance Foundry; Lester B. Knight; R. I. Adams, project supervisor, Corps of Engineers, U. S. Army, Galveston, Tex., and R. W. Hasty, contracting officer's representative, Birmingham Ordnance Division, Birmingham, under whose jurisdiction the plant falls.



## Offers Power Shovel Book

Technical Bulletin No. 4, "Power Cranes, Shovels and Draglines—Attachments, Traction and Operation," has just been issued by the Power Crane and Shovel Association, 74 Trinity Place, New York 6.

The material covers available front-end attachments for use with power shovels and discusses their application and effective use. Proper positioning of the basic unit for specific jobs encountered in the field also is discussed.

Copies may be secured for $1 from the organization, at the address above. Engineering schools and colleges will receive complimentary copies.

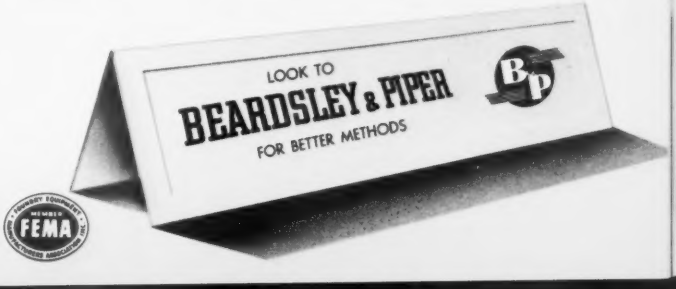
# 4 WORKERS MAN 16 COPE AND DRAG MOLDING STATIONS

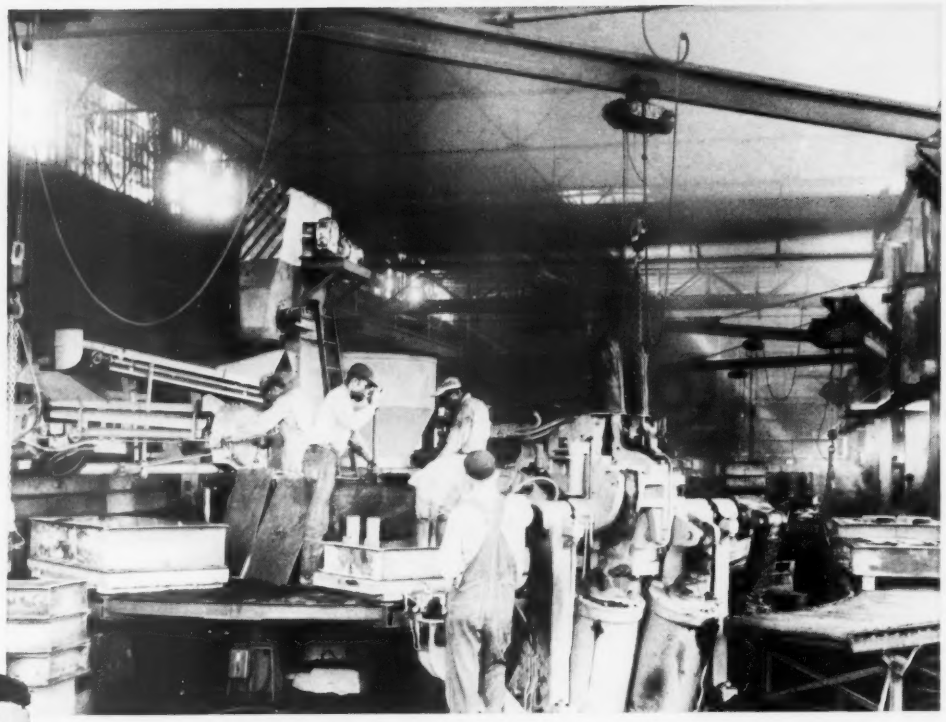
## *on a slinger-turntable unit*

Pattern change down-time is completely eliminated and any number of different patterns may be handled each day on multiple station slinger-turntable units. Because each man handles one operation, only *four* men are needed to man all *sixteen* stations on the turntable. Cope and drag patterns for each job are mounted on a single board which is positioned on roller conveyor sections on the turntable.

A single rollover machine serves all stations and the rammed molds are rolled directly from the table into the machine.

The table is mounted slightly above floor level eliminating the need for large pits. Thus, equipment and installation costs are held at a minimum—only a fraction of that required for sixteen conventional molding units. Write today for complete information, *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*





A J & J 1020 RX rollover pattern-draw machine operates with a slinger-turntable unit at a large western foundry.

# JOB FITTED

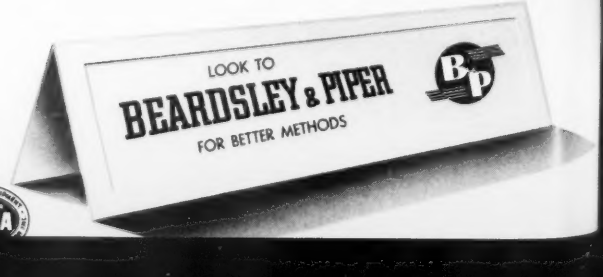
## ... to the new slinger-turntable units

There's a rollover pattern-draw machine especially designed and built to work with the popular new slinger-turntable molding units. It's the Johnston & Jennings RX series manufactured in sizes and designs to fit any multiple-station installation.

The J & J 920 RX and 1020 RX machines are perfect working mates for the new above-floor turntables that are setting new jobbing foundry production records with slingers. They combine the fastest rollover cycle with the most accurate draw obtainable and are *"Job-Fitted"* to work perfectly with slinger-turntable units or with other high production molding units.

*For full information, write to Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*

The J & J 1020 RX
table size 50 x 60 inches
pattern draw 20 inches
capacity 3,000 lbs.,
open-end design permits any length flask to be used.
hydraulic positioner automatically adjusts to maximum and minimum flask heights




MEMBER FEMA

# ANNUAL SOUTHEASTERN FOUNDRY MEETING

## *Attracts Record Registration of 667*

A RECORD attendance marked the 21st annual Southeastern Regional Foundry Conference held in Birmingham, Feb. 19-20. With registration totaling 667 and an interesting and informative technical program provided, the meeting ranked with the most successful of this longest series of any annual regional gathering.

The conference was sponsored by the Birmingham District Chapter of the AFS in co-operation with the Tennessee Chapter and the University of Alabama Student Chapter.

Nine technical papers were included in the program arranged by a committee headed by Biddle W. Worthington, McWane Cast Iron Pipe Co., Birmingham, with Karl Landgrebe, Wheland Co., Chattanooga, Tenn., co-chairman. Other features included a luncheon session the opening day, an entertainment program that evening, inspection of local plants Friday morning, and the concluding annual banquet Friday evening.

Opening technical session was addressed by S. C. Massari, technical director, AFS, who discussed "Effect of Gating Design on Casting Quality." This covered the latest work sponsored by the society's Light Metals Division at Battelle Memorial Institute in studying the fluid flow of metals, and included the showing of a motion picture on the subject. This phase of the investigation is concerned with sprue base design. The study has resulted in recommending use of a pouring basin, a tapered sprue, an enlarged base for the well, and rounded runners that are reduced in cross-sectional area after each in-gate.

By WILLIAM G. GUDE
*Managing Editor*
*FOUNDRY*

Oscar J. Stoesser, general superintendent, Crane Co., Chattanooga, discussed some of the problems encountered in producing thin-walled castings such as bathtubs and radiation. Important requirements in such work include extremely accurate patterns and hot, fluid metal. Regular use of the spiral test is advisable to check fluidity. In instances where the metal is required to travel excessively in filling the mold cavity, thereby losing temperature and fluidity, the condition may be corrected by adding another sprue and the use of step gates.

A capacity crowd of more than 300 attended the Thursday luncheon, presided over by Vice Chairman Biddle W. Worthington. Mayor W. Cooper Green of Birmingham welcomed the foundrymen to the city, and the principal address was given by AFS Vice President Collins L. Carter, president, Albion Malleable Iron Co., Albion, Mich. Mr. Carter presented a detailed review of important activities of the society. He also announced that a new site in Des Plaines, Ill., has been selected for the AFS headquarters.

Two talks on the subject of shell molding opened the afternoon technical program. Richard Herold, manager, foundry products department, the Borden Co., New York, pointed out the advantages and limitations of the process. He said that major economies result only on production runs of those castings which permit a large reduction in subsequent machining. Mr. Herold believes an important field for shell mold castings will be in replacing forgings and weldments.

Floyd R. Schulz, Mechanical Handling Systems Inc., Detroit, described various of the fundamentals connected with shell molding operations and presented a motion picture showing a new 12-station automatic machine developed by his company. This unit is capable of producing 500 shells an hour with one operator. Mr. Schulz expressed the belief that shell molding is readily adapted to production of castings weighing up to 100 lb, instead of the 20 to 30 lb limit once regarded as the maximum weight for which most castings would be converted from sand molding.

L. C. Beers, vice president, Claude B. Schneible Co., Detroit, discussed important features of the enlarged and modernized Studebaker Corp. foundry at South Bend, Ind., and showed the Schneible film, "The Invisible Shield." Many scenes of this picture were filmed at the Studebaker plant, showing the use of modern equipment in controlling dust and improving ventilation.

The first day's concluding talk was by George K. Dreher, executive director, Foundry Educational Foundation. In discussion and by means of a new FEF film Mr. Dreher outlined the important progress made by the foundation since its inception.

Major foundries of the Birmingham area opened their plants for inspection Friday morning, and most conference visitors took advantage of the opportunity for visits. Arrangements for plant visitations were made by a committee headed by Ross

(*Concluded on page* 153)

The annual banquet concluding the conference filled the Tutwiler Hotel's ballroom to capacity

telling the story of 'dag' dispersions

## Why You Should Use 'dag' Dry Film Mold Wash

Above all, you want a mold wash to prevent sticking. A **'dag'** dispersion of colloidal graphite does it best because it is a unique, friction-fighting material that forms a microscopically thin *dry lubricating film.* This film is more slippery than almost anything you can name.

'dag' dispersions can be applied by spraying, painting or dipping. Try them as parting compounds in sand, permanent-mold, and die casting . . . on molds, patterns, chills, cores, push pins, shoulder screws, flask pins, and ladle interiors. Parting will be quicker, castings smoother. Binding and stripping will be eliminated. Chills will tap off easily.

As an added benefit, water dispersions of **'dag'** colloidal products get rid of the irritating smoke caused by most parting compounds.

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Units of Acheson Industries, Inc.

try 'dag' resin-bonded dry films for permanent lubrication

(*Concluded from page* 151)

Martin Jr., McWane Cast Iron Pipe Co. and Ernest C. Finch, American Cast Iron Pipe Co.

At the concluding technical session, Keith D. Millis, International Nickel Co., New York, described developments in applications of ductile iron castings. More than 100 foundries in the United States and Canada now are producing such castings, with approximately an equal number licensed abroad. Mr. Millis added that about one-fourth of these foundries operate basic-lined cupolas. Among the newer producers, one of the major electrical equipment manufacturers is spending $1 million to provide facilities for production of ductile iron castings.

Noteworthy applications of ductile iron recently have been for pressure-tight castings, valves and motor frames for naval use, grate bars, and ingot hot tops. The French have applied ductile iron pipe to seagoing oil barges, to provide corrosion resistance.

An interesting report describing the effect of the carbon equivalent on the properties of cast iron was presented by Warren C. Jeffery, University of Alabama. The report was prepared by him, Edwin E. Langer Jr. and Ghulam D. Azizi of the same school. This year-long work is an attempt to establish the relationship of carbon equivalent to such properties as strength, hardness, fluidity, chill, shrinkage and machinability. Numerous test castings were made and from their analysis it was possible to prepare charts which establish the trend in the different properties in proportion to carbon equivalent variations. Practical use in the foundry of these findings is indicated.

The final technical paper, by J. Robert Cardwell, Stockham Valves & Fittings Inc., Birmingham, covered "Practical Cupola Operation." Mr. Cardwell stressed the importance of good supervision and housekeeping and adequate control tests. He emphasized that tests should be made regularly and frequently if trends are to be detected promptly. Regular inspection of weighing devices also is desirable. In general, he concluded, a cupola's condition reflects the treatment given it.

The annual banquet concluding the conference had a capacity attendance. Fred K. Brown, Birmingham District Chapter chairman, presided —and for the last time; his unexpected death a week after the conference is reported elsewhere in this issue. Charles S. Northen, vice president, U. S. Pipe & Foundry Co., served as toastmaster and introduced the principal speaker—Hugh Comer, chairman, Avondale Mills, Sylacauga, Ala.

Conference scenes. Luncheon speaker's table (top panel) has, left to right: Rev. C. C. J. Carpenter; B. C. Worthington, Birmingham chapter vice chairman; C. L. Carter, AFS vice president; Birmingham's Mayor W. C. Green; the late Fred K. Brown, Birmingham Chapter chairman. In center panel are: R. L. Jackson, registration chairman; M. L. Hawkins, greeters chairman; J. F. Drenning, Birmingham Chapter secretary-treasurer; W. G. Bach, entertainment chairman; C. C. Savage, session chairman; F. R. Schulz, speaker. Bottom: Howard Nelson, session chairman; G. K. Dreher, speaker; S. C. Massari, AFS technical director and one of the conference speakers, with Steve D. Moxley, American Cast Iron Pipe Co.

Mr. Comer, sparking his talk with humor, predicted that a new prosperity is at hand for the South, one based on intelligent development of all resources at hand. Industrial expansion and application of mechanization will play important parts in this creation of a "new South."

## Book Review

*Advanced Mechanics of Materials*, by Fred B. Seely, M. S., and James O. Smith, A. M., cloth, 680 pages, 6 x 9 in., published by John Wiley & Sons Inc., New York. Price $8.50.

This second edition of a volume first published 20 years ago includes much new material and a more penetrating and comprehensive treatment of the subject. Of the six parts of the book, two are new—"The Influence of Small Inelastic Strains on the Load-Carrying Capacity of Members" and "Introduction to Instability—Buckling Loads." Other new material appears in the remaining four sections, and two new appendixes also have been added.

The book was prepared primarily for advanced undergraduate and first-year graduate students in engineering, but the needs of design and research engineers were kept in mind in the selection of topics and the method of presentation.

# Osborn Rota-Lift's r

This Osborn ROTA-LIFT installation produces complete molds 16 to 20 inches wide and 30 to 48 inches long . . . *nine times faster than before.*

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue Cleveland 14, Ohio

# lts speak louder than words

**BEFORE ROTA-LIFT**

**20 molds per day**

**One molder...one helper**

**AFTER ROTA-LIFT**

**90 molds per day**

**One molder...no helper**

## Hines Flask Company reports these savings from installations of Osborn Rota-Lifts

ROTA-LIFT has *increased production per man hour 9 times.* Molds ranging from 16 to 20 inches wide and 30 to 48 inches long were formerly produced at a rate of 20 per day with one molder and helper. After Rota-Lifts were installed, production increased to *90 molds per day* using one operator and the same flask and matchplate pattern equipment.

Osborn ROTA-LIFT eliminates heavy manual effort by mechanizing the jolt, rollover, squeeze, cope draw and closing operations. One man operating one machine makes complete molds from large matchplate patterns. ROTA-LIFT handles a wide range of flask sizes . . . normally can be set up for rapid change of short run jobs using existing pattern equipment.

Perhaps similar savings can be duplicated in your foundry. Have an experienced Osborn molding specialist survey your needs and recommend the most modern, efficient equipment from Osborn's complete line of molding machines and core blowers. Call or write *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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OSBORN®

MOLDING MACHINES CORE BLOWING MACHINES INDUSTRIAL BRUSHES

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

# Industry BRIEFS

IN AN industry safety program among foundries conducted by Tennessee Department of Labor from June through November last year, accident frequency rate was reduced by 41 per cent. Three Chattanooga foundries, among 13 in the state with no lost-time accidents, were American Brake Shoe Co., Acheson Foundry & Machine Works, and Cole Engineering Co. Athens Plow Co., Athens, and Brown Stove Works, Cleveland, were other plants in the state which had no lost-time accidents. Forty-nine of the 52 state foundries participated in the program.

* * *

Williston & Co., Delta, O., has appointed the following exclusive sales agents for American Clay Forming Co.'s ceramic strainer cores: Calmo Enginering Co., 1500 Esperanza St., Los Angeles 23, in southern California; Fire Brick Service & Supply Co., 900 E. 72nd St., Cleveland, in northern Ohio; Badger Fire Brick & Supply Co., 1120 S. Barclay St., Milwaukee 4, in Wisconsin; A. P. Green Fire Brick Co. of Michigan, 2775 E. Grand Blvd., Detroit 11, in Michigan; and St. Louis Coke & Foundry Supply Co., 1525 Sublette Ave., St. Louis 10, in southern Illinois, Missouri, Kansas and Oklahoma.

* * *

Allison Division, General Motors Corp., Indianapolis, Ind., is erecting a 36,000 sq ft structure east of Allison Plant 11 to supplement present facilities at that plant. The added space will provide about 18,000 sq ft for bearings casting. The balance will be used for production, engineering and research on bearings. All bearings foundry work will be consolidated in the new building.

* * *

Mechanical Division, Goodyear Tire & Rubber Co., Akron, O., marked its 40th anniversary recently. The division began operations in 1913 with four products and now produces 20 major categories of products in the industrial rubber goods field with more than 20,000 different specifications for manufacture. Current volume is 120 times that of 1913.

* * *

C. Alexander Brassert has acquired a controlling interest in Furnace Engineers Inc., Pittsburgh, builder of industrial furnaces. The latter will be operated as an associated company of Brassert Corp., Niles Construction Co. and Standard Boiler & Plate Iron Co. New officers of Furnace Engineers are C. Alexander Brassert, chairman; Carlton A. Barrett, president; Nicholas W. Huckestein, vice president and chief engineer, and Stannard B. Pfahl, secretary and treasurer. General offices are at 210 Boulevard of the Allies, Pittsburgh.

* * *

Cleco Division, Reed Roller Bit Co., Houston, Tex., has appointed the following firms to distribute its products in their areas: General Equipment & Machine Co., 511 East Colfax Ave., South Bend 17, Ind.; A & I Supply Co., 614-616 Virginia St. West, Charleston, W. Va.; Lyons Machinery Co., 904 Broadway, Little Rock, Ark.; and Equitable Equipment Co., 410 Camp St., New Orleans 12. Cleco manufactures the Cleco and Dallett lines of air tools and accessories.

* * *

Independent Pneumatic Tool Co., Aurora, Ill., changed its name to Thor Power Tool Co., effective Mar. 17. The new name is believed to be more descriptive of the company's operations than was the old one. The trade name "Thor" has been used to identify all the firm's power tools since 1893.

* * *

Cargan Products Co. has been formed at 606 West Wisconsin Ave., Milwaukee 3, for the production and sale of a new product, Cargan cupola gun mix. A specially designed plant has been erected at Berlin, Wis., where Cargan mix is to be made. Basic ingredient of the mix is electric furnace quartzite ganister.

* * *

Clifford B. Cornell, secretary-treasurer, Cleveland Flux Co., Cleveland, headed a group which recently acquired the Clyde Cutlery Co., Clyde, O. Mr. Cornell is treasurer of the Clyde company, and C. T. Jensen of Cleveland Flux Co. is vice president.

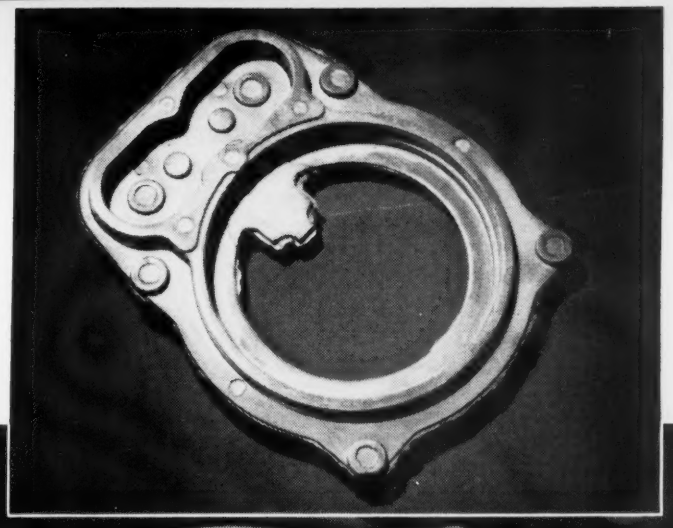
* * *

Hunter Foundry Co. Inc., producer of brass, bronze and aluminum castings, located for the past 11 years at 8524 S. Vincennes Ave., Chicago, has purchased a plant at 82 Wolf Rd., Mokena, Ill., and moved its operations there effective Mar. 1. Company will maintain its office at 11059 Hale St., Chicago 43.

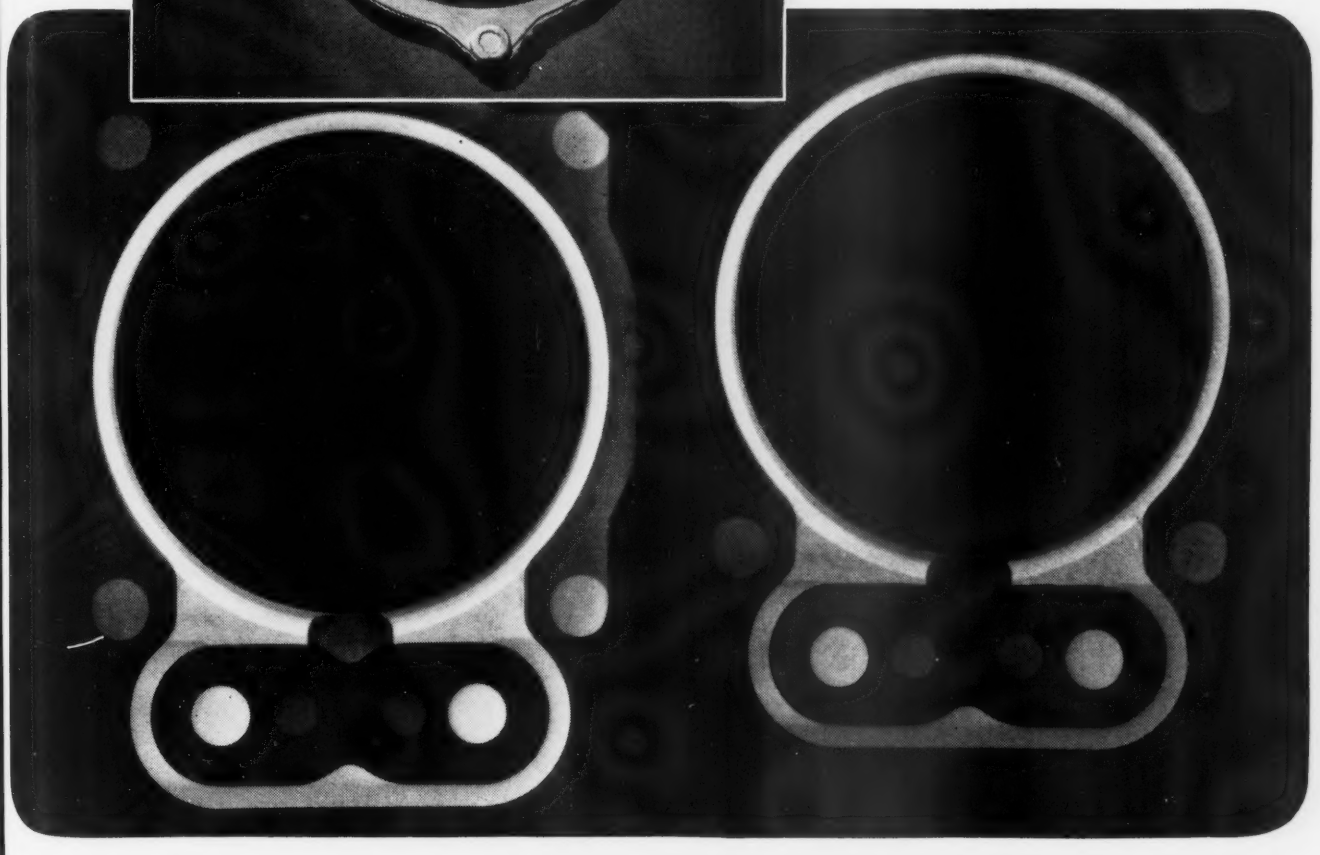
* * *

Wilson Mechanical Instrument Division, American Chain & Cable Co. Inc., has opened a service shop at 20455 Sherwood, Detroit 34, for servicing and repairing hardness testers made by the division.

PLANT EXTENSION: New plant extension by Foxboro Co., Foxboro, Mass., at its Montreal plant more than doubles the company's manufacturing facilities in Canada. Shown at the left, matching the original building in arrangement and appearance, the extension adds 23,000 sq ft of space for the production of instruments and, on a lower level, 5000 sq ft for a new cafeteria for employees and for training school facilities for customers' men



# Sound?



## Radiography removes the doubt

With the plane headed home and landmarks all "zeroed-in," the soundness of this casting becomes vitally important. For it is part of an aircraft instrument which must be accurate without fail.

That is why each of these castings is subjected to the searching eye of radiography. It is the way to be sure no hidden flaw, no gas holes or porosities exist.

Proving soundness with x-rays has become common practice with more and more suppliers of quality castings. They have found it helps build an enviable reputation for delivering only good work. And besides, by radiographing pilot castings, changes in procedures are frequently indicated which increase the yield in long runs.

If you'd like details on how radiography can improve your operations, get in touch with your x-ray dealer. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

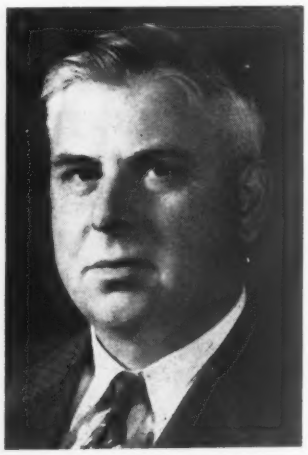
**EASTMAN KODAK COMPANY**
**X-ray Division, Rochester 4, N. Y.**

**Radiography...**
**another important function of photography**

Kodak
TRADE-MARK

# OBITUARY

**RALPH W. HISEY,** 63, director, and until his retirement in 1945, vice president, Osborn Mfg. Co., Cleveland, died Feb. 14. Mr. Hisey was associated with the company 33 years. He began as secretary to the



RALPH W. HISEY

chief engineer, became assistant works manager and later was named secretary and factory manager of the machine division. He was elected vice president in 1935 and in 1944 was appointed head of all manufacturing and engineering in the brush and machine divisions. Mr. Hisey was president of Foundry Equipment Manufacturers Association during 1943-44.

**Arthur W. Gibby,** 80, for many years owner of the Condor Foundry, East Boston, and long-time treasurer of the New England Foundrymen's Association, died Feb. 16 at the home of his son George, West Topsham, Vt. He was the last charter member of the New England Foundrymen's Association organized in May, 1895. The late Mr. Gibby, member of a foundry family, was born and educated in Boston. With his brothers Harry and George he learned the foundry business under his father in the Mechanic's Foundry Co., Roxbury, Mass. Later he transferred to the Gibby Foundry Co., established by brother George in East Boston, and eventually came to own the business. Mechanic's Foundry still is operated by Harry Gibby.

* * *

**Melvin H. Kuhl,** 52, assistant general manager, Industrial Division, Timken Roller Bearing Co., Canton, O., died Feb. 12. Mr. Kuhl joined the company in 1926, and served in the Cleveland, Buffalo, N. Y., and Detroit offices until he was transferred to the Canton industrial sales order department in 1939.

* * *

**Fred K. Brown, Sr.,** 59, well known to southern foundrymen, died Feb. 28 in Birmingham. For a number of years Mr. Brown was sales manager of Adams, Rowe & Norman Inc., Birmingham. About a year ago he formed the Fred K. Brown Co. to act as foundry consultant and dealer in coal, coke and pig iron. Mr. Brown was one of the most active members of the Birmingham District Chapter of the AFS, serving for many years as its secretary-treasurer and this year as chairman.

* * *

**Irving R. Smith,** 69, president, Sterling Wheelbarrow Co., West Allis, Wis., maker of foundry flasks and castings, died Feb. 26 in Milwaukee. Mr. Smith also was president, Lawran Foundry Co., Milwaukee, and an affiliated company, Sterling Foundries Specialties Ltd., with plants in Bedford and Jarrow, England. He was the son of T. L. Smith who founded Sterling Wheelbarrow Co. in 1904. Irving Smith opened the English branches of the foundry in 1920 and became president of the wheelbarrow and foundry companies when his father died.

* * *

**T. Harry Cochrane,** 76, owner of T. H. Cochrane Laboratories, Milwaukee, died Feb. 9, in Pompano Beach, Fla. Mr. Cochrane, a native of Milwaukee, was associated with the former Northwestern Malleable Iron Co., there. About 50 years ago he organized his own metallurgical laboratories.

* * *

**Theodore B. Drescher,** 58, vice president, Bausch & Lomb Optical Co., Rochester, N. Y., died Feb. 22. Mr. Drescher attended Cornell University and joined the company's instrument division in 1914.

* * *

**William B. Greenlee,** 80, chairman of the board of directors, Greenlee Bros. Inc., Rockford, Ill., Greenlee Foundry Co., Northwestern Stove Repair Co., and North Western Foundry Co., all of Chicago, died Mar. 1.

* * *

**William C. Domino,** until recently sales representative, Swedish Crucible Steel Co., Cleveland, died Mar. 4. Mr. Domino was sales manager of West Steel Castings Co. there, for 20 years.

* * *

**Thomas S. Brown,** director of purchasing, A. S. Campbell Co., and its subsidiary, Hunt-Spiller Mfg. Corp. Boston, died Feb. 21.

---

Directors of American Smelting & Refining Co., New York, have approved a merger with Federal Mining & Smelting Co., a 55 per cent owned subsidiary. The merger is subject to approval by stockholders of both companies.

# MARKET DEVELOPMENT MEETING

## *Planned by Malleable Founders*

ANNUAL Market Development Conference of the Malleable Founders' Society will be held at the Illinois Institute of Technology, Chicago, Apr. 9-10.

The two-day meeting will include a diversified program of talks covering both merchandising problems and subjects relating to casting materials and production methods. Among the latter will be discussions of shell molding and pearlitic malleable iron. The society's Market Development Committee, headed by T. A. Scanlan, Eastern Malleable Iron Co., Newburgh, N. Y., is sponsoring the conference.

**Thursday, Apr. 9**

**9:30 a.m.**—Registration.

**10 a.m.**—Conference opens. T. A. Scanlan, Eastern Malleable Iron Co., Newburgh, N. Y., presiding; welcome and remarks by President Rettaliata, Illinois Institute of Technology; remarks by Frank D. Brisse, Laconia Malleable Iron Co., and president, MFS. "A View of the Malleable Industry," by H. R. Clauser, managing editor, *Materials and Methods*, New York. "Basic Selling Principles," speaker to be announced.

**12 noon**—Luncheon, Illinois Institute campus.

**1:15 p.m.**—"Progress in the Foundry Industry": Twenty-minute talks on "Shell Molding," by Bernard N. Ames, supervising physical metallurgist, Brooklyn Navy Yard, Brooklyn, N. Y.; Walter Sokolosky, Plastics Division, Monsanto Chemical Co., Springfield, Mass.; Ray Sutter, president, Sutter Products Co., Detroit; presentation of the film, "Mechanical Equipment for Shell Molding."

"Non-Destructive Testing," by Kermit A. Skeie, Midwest district manager, Magnaflux Corp., Chicago; "Machining Properties of Malleable," by L. V. Colwell, Department of Production Engineering, University of Michigan, Ann Arbor, Mich.; "Pearlitic Malleable," by H. E. Steinhoff, vice president, Wagner Malleable Iron Co., Decatur, Ill.

**6 p.m.**—Cocktails and dinner, Conrad Hilton Hotel, Chicago. Entertainment and an address, "Much To Do about Something," by James E. Gheen, New York.

**Friday, Apr. 10**

**10 a.m.**—"Important Attributes of Malleable," by Carl L. Liebau, executive vice president and general manager, Federal Malleable Co., West Allis, Wis.; "What Makes a Good Malleable Salesman," by Walter W. Bronson, Bronson & Townsend Co., New Haven, Conn.; "Factors in Selecting Metals," speaker to be announced; and "Ringing Door Bells," by George T. Boli, president, Northern Malleable Iron Co., St. Paul.

**12 noon**—Luncheon, Illinois Institute campus.

**1:15 p.m.**—"From Design to Shipment," and "Better Business Talking or The Human Side of Selling," speakers to be announced; "It's up to US," by Harry Walter, president, Gerrard Steel Strapping Division, U. S. Steel Corp., Chicago; Concluding remarks by Frank O. Parker, vice president and sales manager, Dayton Malleable Iron Co., Dayton, O.

**6 p.m.**—Cocktails and dinner, Conrad Hilton Hotel, Chicago. Entertainment and an address.

# the core-maker's helper

**SMITH.**

**L-O**

**CORE OIL**

**SMITH L-O** . . . helps produce sound, accurate cores because of its uniform high quality and Dow-Therm processing.

**SMITH L-O** . . . helps increase core capacity from conventional up to 50% because it responds well to oven temperatures from 350° up to 550°.

**SMITH L-O** . . . helps keep production humming because L-O made cores are tough yet flexible — smooth-working — afford complete collapsibility.

**SMITH L-O** . . . helps in all types of casting because there's a selection of 20 grades, one of which is *best suited* to your particular conditions.

**SMITH L-O** . . . the oil to mention where cores are concerned.

## Smith L-O Core Oil

ROD DIP LIQUID PARTING

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In The Following Cities

- COLUMBIAN WAREHOUSE CO. Reading, Pennsylvania
- ELTEX CHEMICAL COMPANY Houston 2, Texas
- FOUNDRIES MATERIALS CO. Coldwater, Michigan
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- MALCOLM G. STEVENS Arlington, Massachusetts
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- ST. LOUIS COKE & FOUNDRY SUPPLY CO. *(formerly M. W. Warren Coke Co.)* St. Louis, Missouri
- WESTERN FOUNDRY SAND CO. Seattle, Washington
- WESTERN INDUSTRIAL SUPPLY CO. Portland 14, Oregon

**SMITH OIL & REFINING CO.**

MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
INDUSTRIAL OILS DIVISION • ROCKFORD, ILLINOIS

By EDWIN BREMER

# Foundry DEVELOPMENTS

UNIQUE procedure is followed in one foundry using a water-cooled, basic-lined cupola operated 8 hr per day in that the bottom is dropped only once a week. Practice at the end of each day's heat is to drain out all iron and slag. Then the slag hole at the back of the cupola is mudded up, and all the tuyere openings plugged reasonably tight with dry-sand cores. Taphole opening is partially closed off with a mound of damp molding sand. Cupola then stands until next morning when the operator builds up the taphole.

Core plugs are removed from the tuyeres and the blast is turned on for a few minutes to blow the ash formed by combustion of coke during the night, out of the stack. Operator then adds sufficient coke to bring the bed to the proper height, permits it to burn through thoroughly, and then charging is begun. It is claimed that the 48-in. bed in the cupola drops only 10 to 12 in. during the down period.

* * *

ONE foundry solved its core drier problem for use in dielectric baking units by making them of sand. Sand mix for the driers contains double the amount of urea resin binder as used for the cores. Driers are given a thorough bake, and later are sprayed with three coats of brass lacquer. They then are baked for 20 minutes in a core oven of the ordinary type.

* * *

INVESTIGATIONS by the British point out that since molten steel does not "wet" molding sands, pressure is required to force the molten metal into the pores of the rammed sand. With an apparatus developed to simulate the physical conditions obtaining at the steel-mold interface, it was found that the penetrating pressure for molten steel ranged from about 3.9 to 23.6 psi. Once the minimum penetrating pressure has been attained, molten steel with its low viscosity will flow easily into the interstices between the sand grains before solidification occurs.

* * *

KNOWLEDGE of the orientation of crystals in metals is often of practical importance, but no generally satisfactory method has been available for determining the orientation of the small crystals found in commercial metals. Due to the need for such method the National Bureau of Standards is investigating the possibility of estimating crystal orientation from measurements of changes in the characteristics of polarized light. Work is being conducted by H. C. Vacher, and results so far indicate that in the case of Monel (70 Ni-30 Cu) metal crystal orientation can be correlated with extinctions of polarized light.

* * *

MOTOR CASTINGS CO., Milwaukee, which has been experimenting with high-pressure molding for several years, is working on the installation of a pilot production line to determine the feasibility of this type of casting production. Work done so far indicates that better finishes and closer pattern reproduction can be obtained by high-pressure molding than by use of present conventional molding methods.

* * *

RECENT issuance of the Specifications for Brazing Filler Metal jointly prepared by the American Society for Testing Materials and the American Welding Society brings the total in the series of filler metal specifications to eight. The Brazing Filler Metal specifications cover every type of brazing filler metal in common use today. The 33 different classifications are divided into groups according to the principal constituents including aluminum-silicon, copper-phosphorus, silver, copper-gold, copper and copper-zinc, magnesium, and heat resisting filler metals. An appendix gives information on selection of metal best suited for a given application with data on brazing temperature range, color of joint, recommended joint designs, and fundamental concepts of brazing. Copies of the specification may be obtained for 40 cents each from either of the societies.

* * *

ONE of the most simple, practical and informative tests available to both ferrous and nonferrous foundrymen is the fracture test. It is particularly useful when a pattern first goes into the sand as it quickly will indicate whether or not the gating system is adequate. A useful tool in connection with fracture study is a low-power magnifying glass which enables one to distinguish more clearly such phenomena as minute shrinkage areas, dendritic structure, small gas holes, etc. Fracturing and use of the magnifying glass should not be relegated to times of trouble, but should be employed at regular intervals. In that way trends toward trouble may be corrected before they become major.

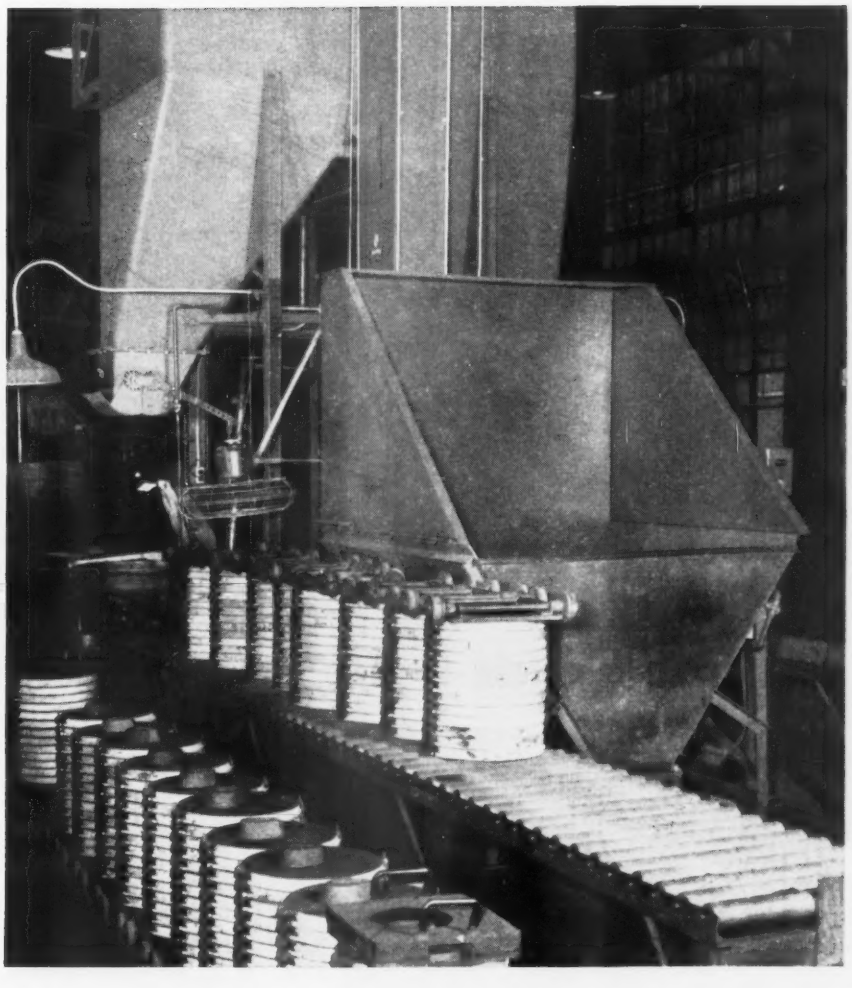
* * *

RECENTLY our attention was directed to a matter which aptly illustrates the all too common tendency to substitute effect for cause, or in the vernacular—placing the cart before the horse. It pertains to those reports on safety known as "Accident Reports" which list only *injuries*. Naturally, those are the effects or results of certain types of accidents, but other types of accidents which do not cause injuries are ignored. Since every accident is the potential source for an injury, and estimates are that there are ten times as many accidents as injuries, it might be well worthwhile to list *all* accidents. Such recording would operate toward closer attention to elimination of accidents in general rather than specific.

* * *

ADDITION of a small amount of aluminum to yellow brasses serves the purpose of suppressing zinc fumes to some extent and also seems to aid in its flow characteristics. However, its use in castings which must withstand pressure usually leads to trouble since the aluminum oxide skin or envelope surrounding the molten metal stream becomes broken, and inclusions are carried into the casting cavity. Such difficulty can be circumvented by proper gating, as witnessed in the case of manganese bronze, by admitting the metal without turbulence, and providing suitable dirt or dross catchers.

# No more shoveling for Stanley...



## . . . now that SEALED POWER has a HANDY SANDY

Time spent shoveling by Stanley or any other molder adds to the cost of the molds without adding to their quality. By taking the shovels from their molders' hands and replacing them with the Handy Sandy, Sealed Power Corporation has increased their mold production. Sealed Power uses two twin-hopper Handy Sandys in molding their larger piston rings and thrust plates.

Use of the Handy Sandys diminishes molder fatigue and improves working conditions. It improves the quality of the sand due to the extra aeration given the sand as it enters the overhead hoppers.

Handy Sandy is a low-cost individual-floor sand handling system requiring no costly foundations. It gives you quick mechanization at a price you can afford to pay.

You can mechanize one floor at a time or your entire foundry as you choose. Newaygo will help you plan your mechanization so the savings you make will help pay the cost.

*The catalog "Planned Mechanization for Foundries" tells how. Send for your copy today.*

**NEWAYGO | ENGINEERING COMPANY**

**NEWAYGO, MICHIGAN**

*Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment*

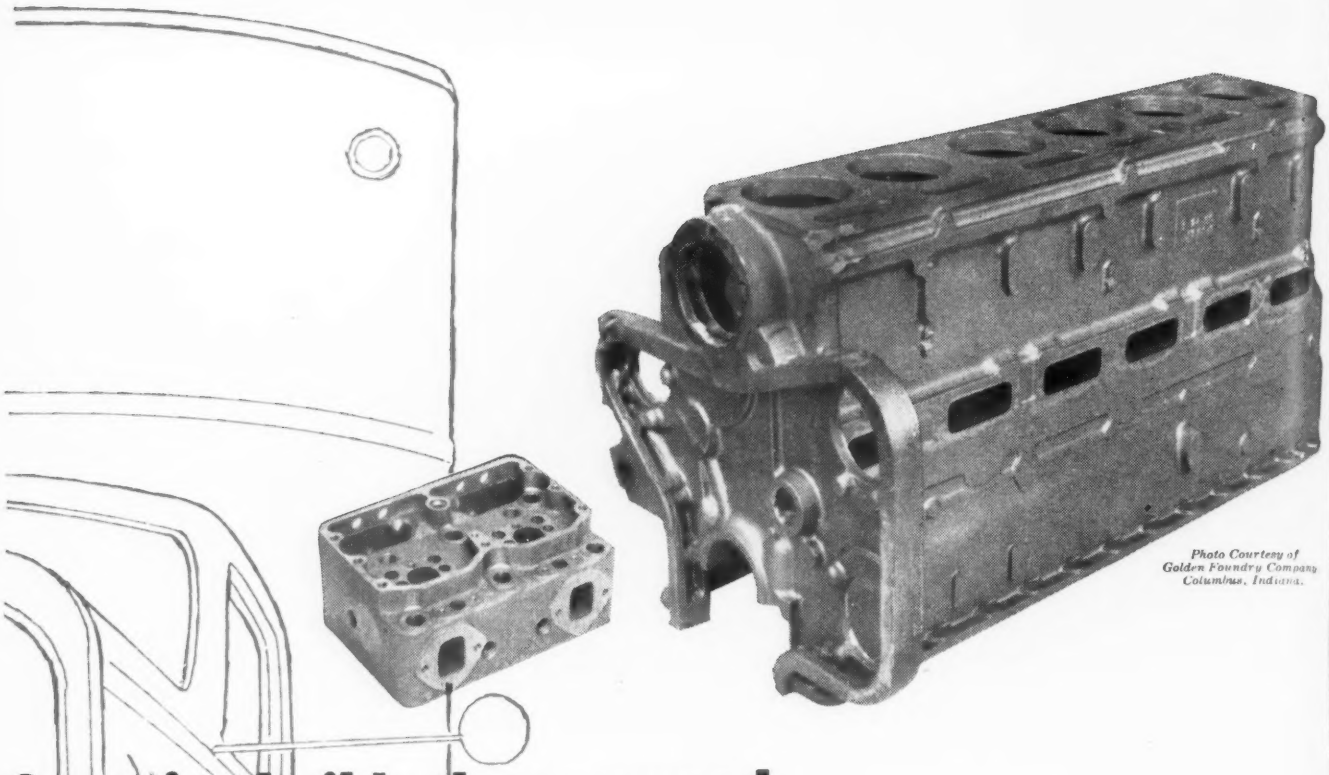


Photo Courtesy of
Golden Foundry Company
Columbus, Indiana.

# Cummins builds them rugged...

## with mighty rigid "Specs"

For rugged dependability, many of the nation's leading truck lines will agree, you can't beat a Cummins Diesel engine. A good reason for that reputation can be found in the rigid requirements for all component engine parts—including the block and cylinder head castings shown above.

To meet these strict requirements, the foundry which furnishes the castings has long made it a point to use only the finest pig iron—including Republic CHATEAUGAY. And the result: *Uniform high strength and machinability throughout every casting,* despite intricate passages and adjoining light and heavy sections.

A Republic Pig Iron Metallurgist will be glad to give you the complete facts about CHATEAUGAY Pig Iron. Write, wire or phone:

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**GENERAL OFFICES • CLEVELAND 1, OHIO**
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**Republic PIG IRON**

| "CHATEAUGAY" | "REPUBLIC" | "PIONEER" |
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| Low-Phosphorus, Copper-Free | (Northern) Foundry, Basic and Malleable | (Southern) Foundry and Basic |

REPUBLIC STEEL

# COMBINATIONS OF BRICK REQUIRED FOR RINGS

The various tables which follow will be found useful in estimating the quantities of brick required for the construction of circular linings, roofs and arches. These tables give combinations of brick sizes required for rings of given diameters.

In calculating the tables, fractional parts equal to or greater than one-tenth of a brick were counted as an entire brick; no allowance was made for mortar or expansion joints or for size deviations of the brick. For these reasons the brick combinations shown may lay up to diameters which differ slightly from the theoretical diameters; and the number of brick required for a ring, as given in the tables, may be slightly in excess of the number actually required.

Generally, in laying a ring course of brick, it is necessary to cut the last one or two pieces to complete the ring.

## 4½-IN. LINING—ARCH BRICK

9 x 4½ x 2½-in. or 13½ x 4½ x 2½-in.

| Diameter Inside Brickwork | Number Required per Ring | | | | |
|---|---|---|---|---|---|
| | No. 3 Arch | No. 2 Arch | No. 1 Arch | Straight | Total |
| 1'- 6" | 4 | 30 | | | 34 |
| 1'- 7" | 3 | 33 | | | 36 |
| 1'- 8" | 2 | 35 | | | 37 |
| 1'- 9" | | 38 | | | 38 |
| 1'-10" | | 36 | 3 | | 39 |
| 1'-11" | | 36 | 5 | | 41 |
| 2'- 0" | | 34 | 8 | | 42 |
| 2'- 1" | | 33 | 10 | | 43 |
| 2'- 2" | | 31 | 13 | | 44 |
| 2'- 3" | | 31 | 15 | | 46 |
| 2'- 4" | | 29 | 18 | | 47 |
| 2'- 5" | | 28 | 20 | | 48 |
| 2'- 6" | | 26 | 23 | | 49 |
| 2'- 7" | | 26 | 25 | | 51 |
| 2'- 8" | | 24 | 28 | | 52 |
| 2'- 9" | | 23 | 30 | | 53 |
| 2'-10" | | 21 | 33 | | 54 |
| 2'-11" | | 20 | 36 | | 56 |
| 3'- 0" | | 19 | 38 | | 57 |
| 3'- 1" | | 18 | 40 | | 58 |
| 3'- 2" | | 16 | 43 | | 59 |
| 3'- 3" | | 15 | 46 | | 61 |
| 3'- 4" | | 14 | 48 | | 62 |
| 3'- 5" | | 13 | 50 | | 63 |
| 3'- 6" | | 11 | 53 | | 64 |
| 3'- 7" | | 10 | 56 | | 66 |
| 3'- 8" | | 9 | 58 | | 67 |
| 3'- 9" | | 8 | 60 | | 68 |
| 3'-10" | | 7 | 63 | | 70 |
| 3'-11" | | 5 | 66 | | 71 |
| 4'- 0" | | 4 | 68 | | 72 |
| 4'- 1" | | 3 | 70 | | 73 |
| 4'- 2" | | 2 | 73 | | 75 |
| 4'- 3" | | | 76 | | 76 |
| 4'- 4" | | | 76 | 1 | 77 |
| 4'- 6" | | | 76 | 4 | 80 |
| 4'- 8" | | | 76 | 6 | 82 |
| 4'-10" | | | 76 | 9 | 85 |

| Diameter Inside Brickwork | Number Required per Ring | | | | |
|---|---|---|---|---|---|
| | No. 3 Arch | No. 2 Arch | No. 1 Arch | Straight | Total |
| 5'- 0" | | | 76 | 11 | 87 |
| 5'- 2" | | | 76 | 14 | 90 |
| 5'- 4" | | | 76 | 16 | 92 |
| 5'- 6" | | | 76 | 19 | 95 |
| 5'- 8" | | | 76 | 21 | 97 |
| 5'-10" | | | 76 | 24 | 100 |
| 6'- 0" | | | 76 | 26 | 102 |
| 6'- 2" | | | 76 | 29 | 105 |
| 6'- 4" | | | 76 | 31 | 107 |
| 6'- 6" | | | 76 | 34 | 110 |
| 6'- 8" | | | 76 | 36 | 112 |
| 6'-10" | | | 76 | 39 | 115 |
| 7'- 0" | | | 76 | 41 | 117 |
| 7'- 2" | | | 76 | 44 | 120 |
| 7'- 4" | | | 76 | 46 | 122 |
| 7'- 6" | | | 76 | 49 | 125 |
| 7'- 8" | | | 76 | 51 | 127 |
| 7'-10" | | | 76 | 54 | 130 |
| 8'- 0" | | | 76 | 56 | 132 |
| 8'- 2" | | | 76 | 59 | 135 |
| 8'- 4" | | | 76 | 61 | 137 |
| 8'- 6" | | | 76 | 64 | 140 |
| 8'- 8" | | | 76 | 66 | 142 |
| 8'-10" | | | 76 | 69 | 145 |
| 9'- 0" | | | 76 | 71 | 147 |
| 9'- 2" | | | 76 | 74 | 150 |
| 9'- 4" | | | 76 | 76 | 152 |
| 9'- 6" | | | 76 | 79 | 155 |
| 9'- 8" | | | 76 | 81 | 157 |
| 9'-10" | | | 76 | 84 | 160 |
| 10'- 0" | | | 76 | 87 | 163 |
| 10'- 2" | | | 76 | 89 | 165 |
| 10'- 4" | | | 76 | 92 | 168 |
| 10'- 6" | | | 76 | 94 | 170 |
| 10'- 8" | | | 76 | 97 | 173 |
| 10'-10" | | | 76 | 99 | 175 |

# COMBINATIONS OF BRICK REQUIRED FOR RINGS

## 4½-IN. LINING—CIRCLE BRICK

9 x 4½ x 2½-in. or 9 x 4½ x 3-in.

| Diameter Inside Brickwork | Number Required per Ring 24-33 Circle | 36-45 Circle | 48-57 Circle | 60-69 Circle | 72-81 Circle | Total |
|---|---|---|---|---|---|---|
| 2′- 0″ | 12 | | | | | 12 |
| 2′- 1″ | 10 | 2 | | | | 12 |
| 2′- 2″ | 10 | 3 | | | | 13 |
| 2′- 3″ | 9 | 4 | | | | 13 |
| 2′- 4″ | 7 | 6 | | | | 13 |
| 2′- 5″ | 7 | 7 | | | | 14 |
| 2′- 6″ | 6 | 8 | | | | 14 |
| 2′- 7″ | 5 | 9 | | | | 14 |
| 2′- 8″ | 4 | 11 | | | | 15 |
| 2′- 9″ | 3 | 12 | | | | 15 |
| 2′-10″ | 2 | 13 | | | | 15 |
| 2′-11″ | 1 | 15 | | | | 16 |
| 3′- 0″ | | 16 | | | | 16 |
| 3′- 1″ | | 14 | 2 | | | 16 |
| 3′- 2″ | | 13 | 4 | | | 17 |
| 3′- 3″ | | 12 | 5 | | | 17 |
| 3′- 4″ | | 11 | 7 | | | 18 |
| 3′- 5″ | | 9 | 9 | | | 18 |
| 3′- 6″ | | 8 | 10 | | | 18 |
| 3′- 7″ | | 7 | 12 | | | 19 |
| 3′- 8″ | | 6 | 13 | | | 19 |
| 3′- 9″ | | 4 | 15 | | | 19 |
| 3′-10″ | | 4 | 16 | | | 20 |
| 3′-11″ | | 2 | 18 | | | 20 |
| 4′- 0″ | | | 20 | | | 20 |
| 4′- 1″ | | | 20 | 1 | | 21 |
| 4′- 2″ | | | 18 | 3 | | 21 |
| 4′- 3″ | | | 16 | 5 | | 21 |
| 4′- 4″ | | | 14 | 8 | | 22 |
| 4′- 5″ | | | 12 | 10 | | 22 |
| 4′- 6″ | | | 10 | 12 | | 22 |
| 4′- 7″ | | | 8 | 15 | | 23 |
| 4′- 8″ | | | 6 | 17 | | 23 |
| 4′- 9″ | | | 4 | 19 | | 23 |
| 4′-10″ | | | 3 | 21 | | 24 |
| 4′-11″ | | | 1 | 23 | | 24 |
| 5′- 0″ | | | | 24 | | 24 |
| 5′- 1″ | | | | 21 | 4 | 25 |
| 5′- 2″ | | | | 19 | 6 | 25 |
| 5′- 3″ | | | | 17 | 9 | 26 |
| 5′- 4″ | | | | 15 | 11 | 26 |
| 5′- 5″ | | | | 13 | 13 | 26 |

| Diameter Inside Brickwork | Number Required per Ring 60-69 Circle | 72-81 Circle | 84-93 Circle | 93-105 Circle | 108-117 Circle | Total |
|---|---|---|---|---|---|---|
| 5′- 6″ | 12 | 15 | | | | 27 |
| 5′- 7″ | 10 | 17 | | | | 27 |
| 5′- 8″ | 8 | 19 | | | | 27 |
| 5′- 9″ | 6 | 22 | | | | 28 |
| 5′-10″ | 4 | 24 | | | | 28 |
| 5′-11″ | 2 | 26 | | | | 28 |
| 6′- 0″ | | 29 | | | | 29 |
| 6′- 1″ | | 26 | 3 | | | 29 |
| 6′- 2″ | | 23 | 6 | | | 29 |
| 6′- 3″ | | 21 | 9 | | | 30 |
| 6′- 4″ | | 19 | 11 | | | 30 |
| 6′- 5″ | | 16 | 14 | | | 30 |
| 6′- 6″ | | 14 | 17 | | | 31 |
| 6′- 7″ | | 11 | 20 | | | 31 |
| 6′- 8″ | | 9 | 22 | | | 31 |
| 6′- 9″ | | 7 | 25 | | | 32 |
| 6′-10″ | | 4 | 28 | | | 32 |
| 6′-11″ | | 2 | 31 | | | 33 |
| 7′- 0″ | | | 33 | | | 33 |
| 7′- 1″ | | | 28 | 5 | | 33 |
| 7′- 2″ | | | 26 | 8 | | 34 |
| 7′- 3″ | | | 23 | 11 | | 34 |
| 7′- 4″ | | | 20 | 14 | | 34 |
| 7′- 5″ | | | 17 | 18 | | 35 |
| 7′- 6″ | | | 14 | 21 | | 35 |
| 7′- 7″ | | | 11 | 24 | | 35 |
| 7′- 8″ | | | 8 | 28 | | 36 |
| 7′- 9″ | | | 5 | 31 | | 36 |
| 7′-10″ | | | 2 | 34 | | 36 |
| 7′-11″ | | | | 37 | | 37 |
| 8′- 0″ | | | | 37 | | 37 |
| 8′- 1″ | | | | 30 | 7 | 37 |
| 8′- 2″ | | | | 28 | 10 | 38 |
| 8′- 3″ | | | | 25 | 13 | 38 |
| 8′- 4″ | | | | 23 | 15 | 38 |
| 8′- 5″ | | | | 20 | 19 | 39 |
| 8′- 6″ | | | | 18 | 21 | 39 |
| 8′- 7″ | | | | 15 | 24 | 39 |
| 8′- 8″ | | | | 13 | 27 | 40 |
| 8′- 9″ | | | | 10 | 30 | 40 |
| 8′-10″ | | | | 8 | 33 | 41 |
| 8′-11″ | | | | 5 | 36 | 41 |

# THERE'S A U. S. INDUSTRIAL GLOVE TO MEET ALL YOUR INDUSTRIAL NEEDS

#102—Lightweight
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Heavyweight
#1398—Lightweight
#1399—18 in.

## U. S. NEOPRENE DIPPED INDUSTRIAL GLOVES

- Give maximum safety, comfort and economy.
- Withstand gasolines, oils, acids and corrosive chemical solutions.
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- Longer lasting.
- Flexibility plus roughened surface for positive grip. (Also available with smooth surface on special order.)
- Available in a full line of sizes, lengths and weights.

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#1375—14½ in.
#1379—14½ in. reinforced
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#1377—Lightweight

**Knit Wrist Style**
*One size only.*

**Gauntlet Style**
*Heavyweight only.*

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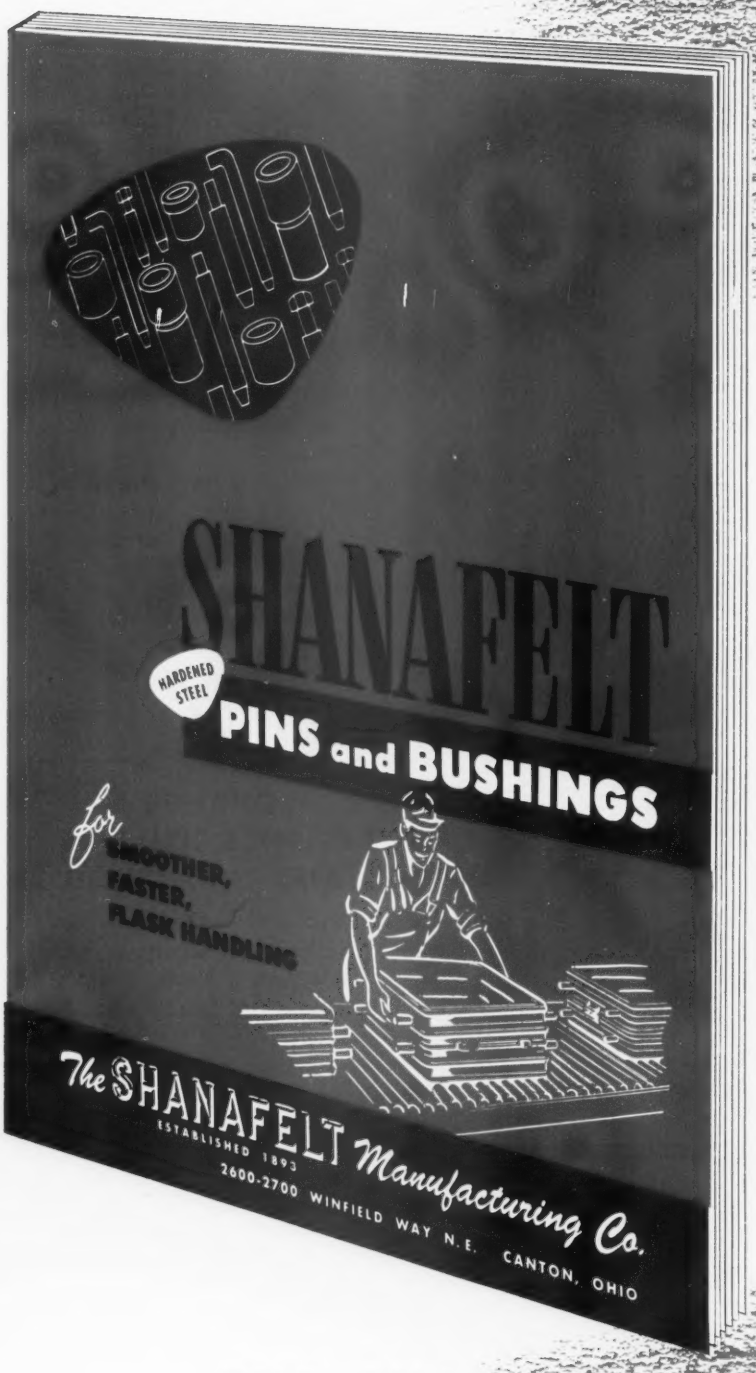


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# NORTHERN CALIFORNIA CHAPTER HOST

## *At Regional Conference in Berkeley*

By CLAYTON D. RUSSELL
Phoenix Iron Works
Oakland, Calif.

FOUNDRYMEN from the East and the South added their numbers to those from California and the Far West to bring total registered attendance at the California Regional Conference to 380. The conference was held Feb. 6-7 at the Hotel Claremont, Berkeley, Calif., under the sponsorship of Northern and Southern California Chapters of the AFS, with the Northern California Chapter as host.

After registration in the morning, Chairman Andrew M. Ondreyco, General Metals Corp., Oakland, Calif., opened the conference shortly after noon on Friday at a management luncheon. Session Chairman Sam Russell introduced Collins L. Carter, vice president, AFS, and president, Albion Malleable Iron Co., Albion, Mich.

The first technical meeting was addressed by Earl Paltenghi, H. C. Macaulay Foundry Co., Berkeley. Chairman was Ralph C. Noah, San Francisco Iron Foundry, San Francisco. Mr. Paltenghi discussed the importance of good foundry cost programs to profitable operations.

Before the Friday evening dinner, 250 foundrymen enjoyed the hospitality of Columbia Geneva Steel Division, U. S. Steel Corp., at a cocktail party. Brief after-dinner speeches were given by General Chairman Ondreyco, Technical Chairman William Gibbons, Ridge Foundry, San Leandro, Calif., and Arrangements Section Chairman John Bermingham, E. F. Houghton Co., San Francisco. George Stewart, East Bay Brass Foundry, San Pablo, Calif., and president, Northern California Chapter of the AFS, presented the seven speakers with bronze book ends.

At the evening technical session on Friday, Chairman A. B. Castagnola, A. B. C. Pattern Works, Oakland, introduced speaker A. L. Goodreau, American Brass & Aluminum Foundry, Los Angeles, whose paper received a good deal of interest. Mr. Goodreau discussed shell molding, including such aspects of the process as practical analyses of sand mixes, mold and pattern design, mold making and pouring.

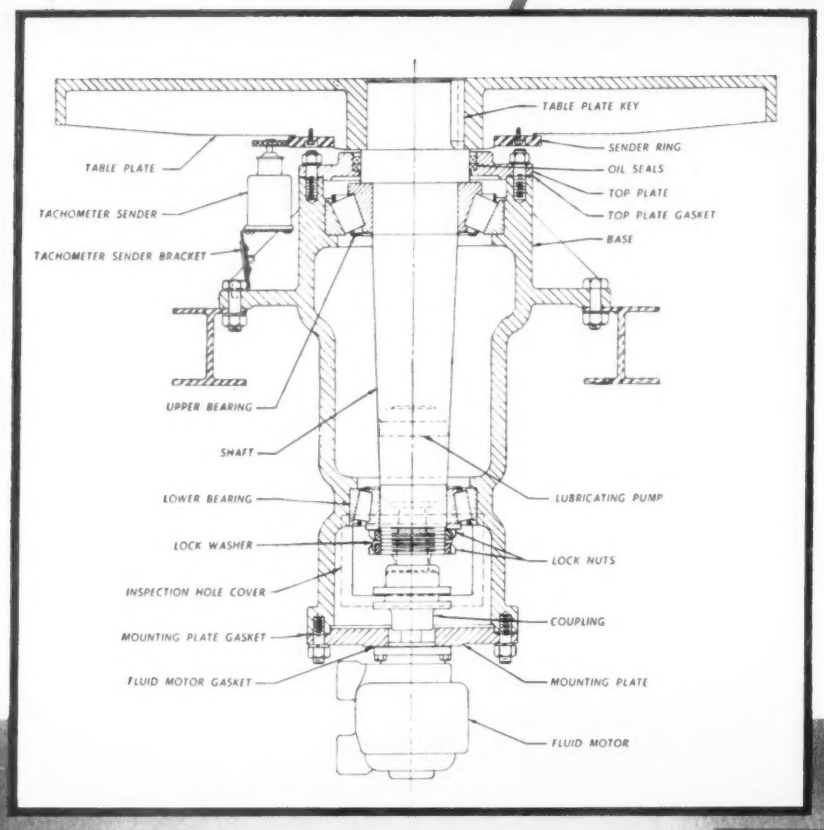
The Saturday program was opened by John A. Watson, General Metals Corp., session chairman, and by Arnold K. Steger, Hanford Foundry Co., San Bernardino, Calif., the speaker, who examined the principles of gating and risering steel castings.

At the following session, the speaker was Sam F. Carter, American Cast Iron Pipe Co., Birmingham, who discussed the basic cupola. His paper concerned the advantages and disadvantages of such cupolas, particularly regarding how they can control sulphur and carbon. Norman E. Schlegel, Waterman Industries, Inc., Exeter, Calif., presided.

The first afternoon session, after a buffet luncheon, heard Harold R. Wolfer, Puget Sound Naval Shipyard, Bremerton, Wash., analyze the applications of mineral perlite in the making of molds and cores for all types of castings. At this session, the chairman was Maurice C. Sandes, Mare Island Navy Yard.

The final session of the conference was opened by Vice Chairman Donald L. Mason, Superior Electrocast Foundry Co., San Francisco, in the absence of Chairman Harold E. Henderson, H. C. Macaulay Foundry Co. Speaker Harry W. Dietert, H. W. Dietert Co., Detroit, explained the properties and applications of molding and core sands and discussed new sand developments.

Seated at the speakers table, from left to right, are Kenneth L. Clark, International Nickel Co., Southern California Section, committee member; Harold R. Wolfer; Philip C. Rodger, General Metals Corp., Oakland, Calif., immediate past president, Northern California Chapter, AFS; Sam F. Carter; William Gibbons; Arnold K. Steger; Sam Russell; Andrew M. Ondreyco; Collins L. Carter; John Bermingham; George Stewart; A. L. Goodreau; Harry W. Dietert; A. B. Castagnola, and Earl Paltenghi

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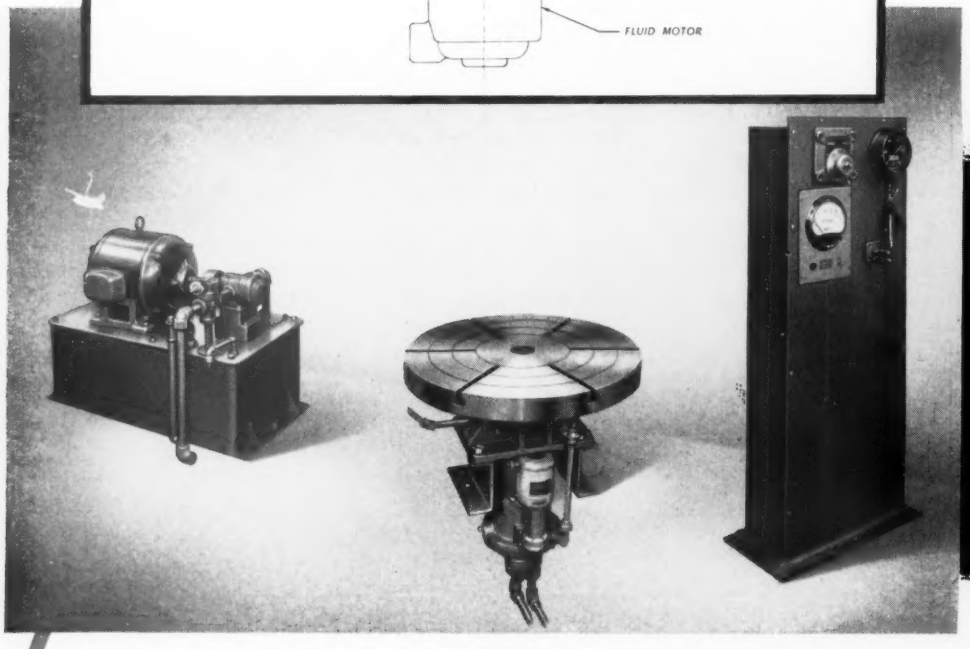

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There are an even dozen reasons why it should be seriously considered, if you are looking for modern casting production by the centrifugal method.

Here are the reasons:

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2 Smooth stepless variance of table speeds from minimum to maximum.

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8 Mechanically lubricated; no manual oiling required.

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10 Flow and volume of oil automatically controlled providing overload protection.

11 Instantaneous setting of rotative speed by dial control on flow valve.

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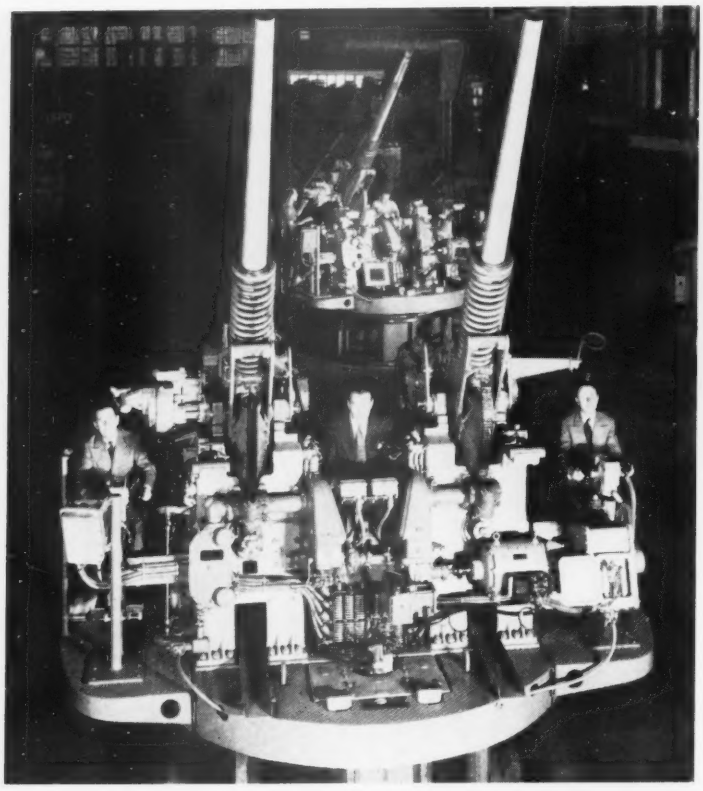
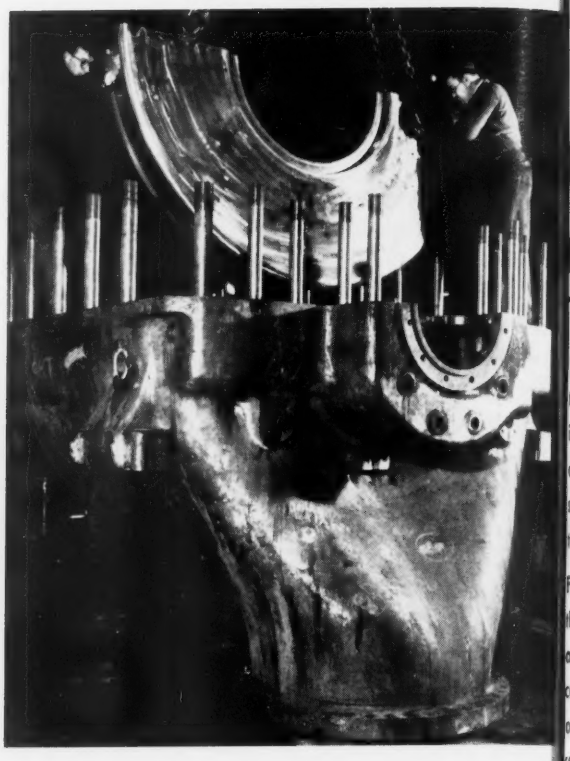
# NEWS VIEWS



ACK ACK: Firestone Tire & Rubber Co., Akron, O., again is tooled up to mass-produce electronically controlled gun mounts, such as this 3-in., twin-fifty, 17-ton model, for the Navy. Equipped with automatic loading devices and radar fire-control systems, the gun can hurl 3-in. shells at low or high-flying aircraft. Left to right are Chairman Harvey S. Firestone Jr. and Vice Presidents J. E. Trainer and Raymond C. Firestone.

CLEANING UP: Once known as the Traxcavator and now called the Caterpillar Shovel, this machine is loading waste outside the knockout shed of the Caterpillar Tractor Co. foundry, Peoria, Ill., where it was manufactured. The machine also is used to load used sand after it has been washed to a discharge point.



COMPRESSOR: One of the high-strength gray iron diaphragms is being lowered into place in the lower case of a multistage centrifugal compressor. The largest compressor of its type ever built for discharge pressures of 100 psi, the complete unit weighs 70 tons. It is one of a number being built at Clark Bros. Co. shops at Olean, N. Y., for use as the main air compressors on huge cat crackers.

GOING UP: Shipment of coke and carbon products between International Graphite & Electrode Division and its parent company, the Speer Carbon Co., St. Marys, Pa., has been speeded up by this hydraulically elevated truck unloader. Built by the Kewanee Mfg. Co., Kewanee, Ill., the unloader tips both truck and trailer to a 40 degree angle and can unload 20,000 lb of coke in just one minute.

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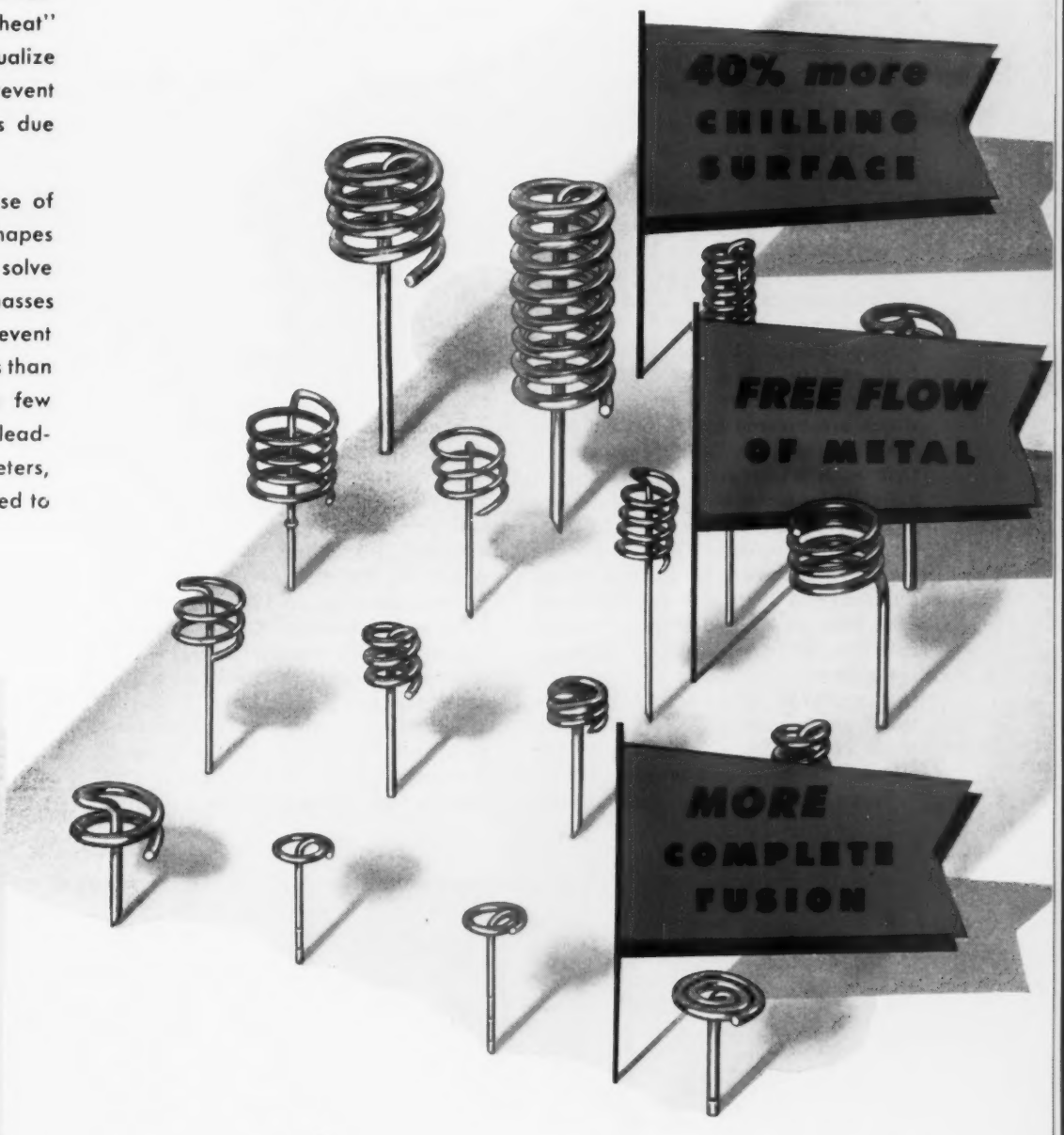


*wrong*

owing how metal has kicked ay from ordinary nail head d in light casting section.

*right*

owing a perfectly solid cast- with fine Fanner Chill Coils.

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## Activities of Foundry

# GROUPS

### Central Illinois

FIRST speaker to make a second appearance before Central Illinois Chapter of the AFS was William Ball Jr., consulting engineer with R. Lavin & Sons, Chicago. Mr. Ball spoke on "Effective Essentials Required To Make Good Castings," at the Feb. 2 meeting held at the American Legion Hall, Peoria.

He pointed out that since brass was first cast in about 5000 B.C., eight basic alloys have been developed which are covered by more than 3000 specifications. Mr. Ball recommended that each basic alloy be considered individually since they all act differently. He stressed greater use of fracture test specimens. Tests should be made, he believes, for each alloy to establish the high and low limits of each heat so that the desired chemical and physical analysis can be maintained. Conversion charges can be calculated systematically by the laws of burdening fuels. Foundry work should be a science like the making of roads and bridges.

Technical chairman was Gilbert Lloyd, Brass Foundry Co., Peoria, who conducted the discussion period at the conclusion of Mr. Ball's talk. Approximately 120 members and guests were present, representing foundries in Decatur, Champaign, Bloomington and Vermont, Ill., in addition to those in the Peoria area.—*L. E. Kinsinger, Caterpillar Tractor Co.*

### Cincinnati

ANNUAL Christmas dinner-dance of Cincinnati District Chapter of the AFS was held Dec. 20 at Hotel Netherland Plaza, Cincinnati. A group of 580 foundrymen and their ladies enjoyed a party that was the best attended in the chapter's history. Activities for the evening included dinner, dancing, and a well-staged floor show. Chapter Chairman Burt Genthe, S. Obermayer Co., presented a jeweled favor to each lady on behalf of the chapter.

January activities returned to technical considerations. J. G. Winget, Furnace Division of Reda Pump Co., Bartlesville, Okla., was the principal speaker. In 1950 Mr. Winget built a direct-fired reverberatory type melting furnace for gray iron, ductile iron and brasses. In reviewing the operation of this new furnace, Mr. Winget indicated the melting economies effected by use of gas or oil over electricity for heats of a few thousand pounds, the time savings effected and the advantages available to both large and small shops by having such units installed.—*David J. Pusack, Cincinnati Milling Machine Co.*

### Rochester

LOCAL patternmakers turned out in good number at the Feb. 3 meeting of Rochester Chapter of the AFS. Walter Siebert, Cleveland Standard Pattern Works, Cleveland, was the featured speaker.

Mr. Siebert opened his talk by stating that the foundry industry is fast approaching pushbutton operation; and patternmakers must know what is required of them. Since patternmaking requires skill and special training, it is necessary to educate new men in the industry. Patterns must be made to suit the peculiarity of the foundry making the castings. With the aid of charts illustrating construction of pattern equipment, Mr. Siebert showed step-by-step construction of a pattern. He advised careful analysis of the blueprint, checking particularly dimensions, surface conditons and cores.

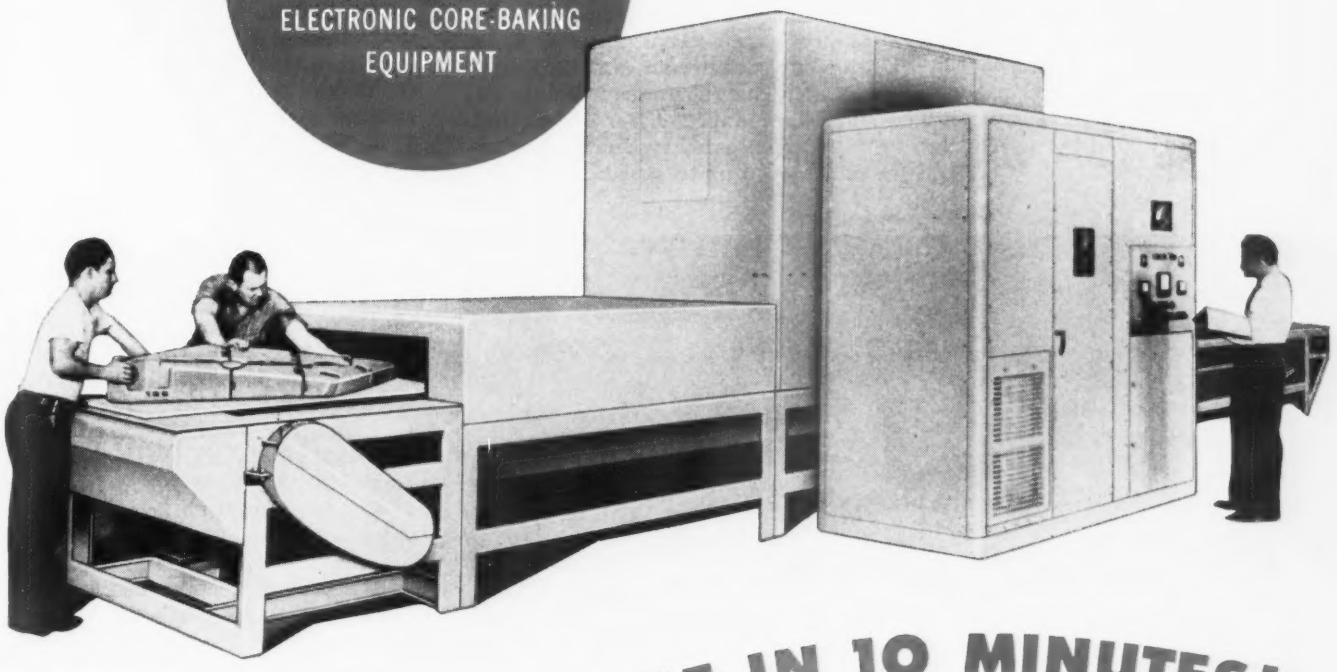
Another recommendation was to confer with the foundryman for design, use of chaplets and coring. Then in construction, the speaker urged heavy enough lumber be used to give the pattern strength, pointing

*(Continued on page 174)*

CINCINNATI Chapter of the AFS held its annual Christmas dinner-dance Dec. 20 at the Pavilion Caprice of the Hotel Netherland Plaza, Cincinnati. Some of the 580 celebrants are shown above

Thermex

ELECTRONIC CORE-BAKING EQUIPMENT



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(*Continued from page* 172)
out that heavy draw plates will give the pattern more life. Mr. Siebert suggested that portions of the pattern subject to wear be so constructed that by removing screws, the part worn can be removed and replaced without breaking up the pattern.

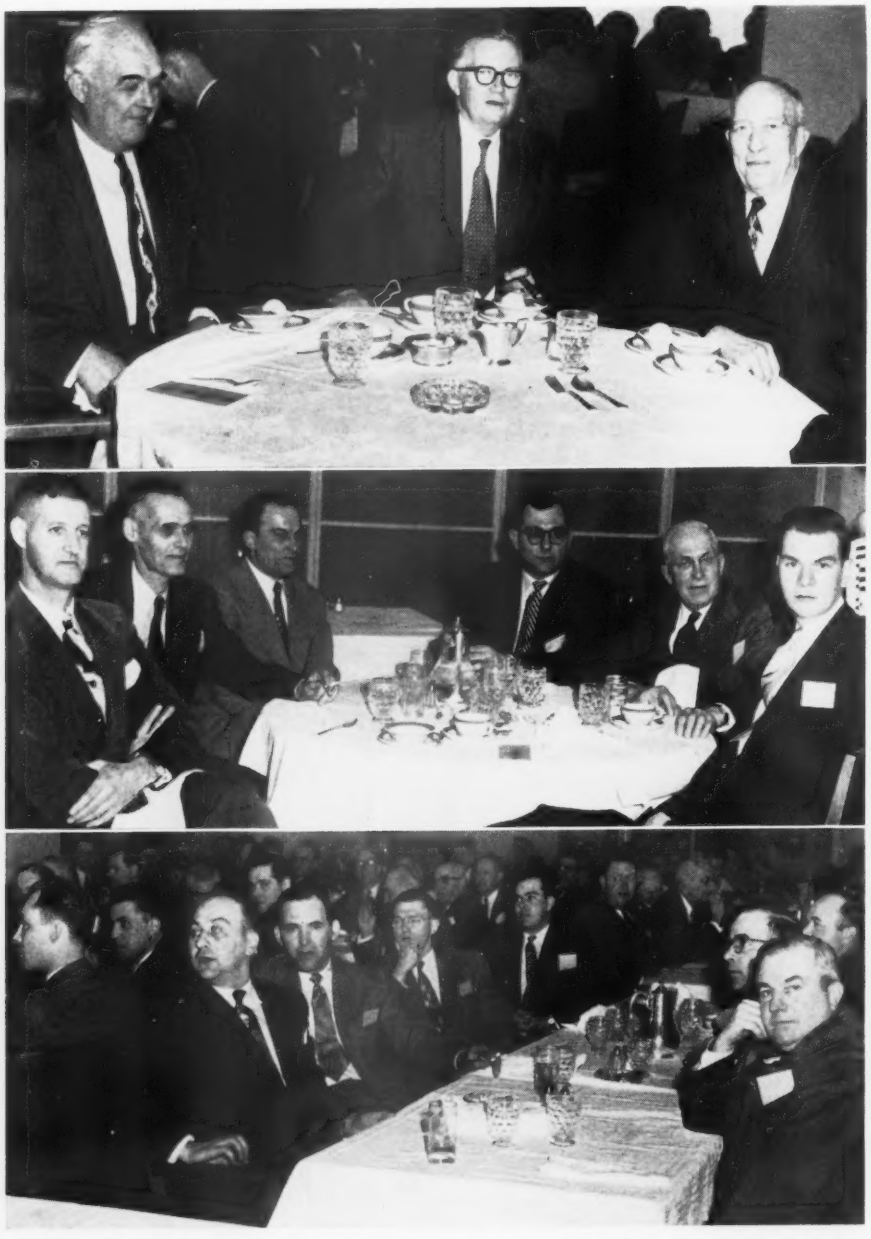
In conclusion he emphasized that pattern shops should maintain a high standard of quality and equipment and that purchasing agents be educated to the value of good patterns and not to buy patterns by price only. — *H. G. Stellwagen, Hetzler Foundries Inc.*

## Toledo

ANNUAL Management Night of the Toledo Chapter, AFS, was held at the Toledo Yacht club on Mar. 4 with an excellent attendance of over 76 per cent of the membership of the chapter. John G. Blake, Alloy Founders Inc., and chairman of the group presided.

He announced new officers for the coming year as B. J. Beierla, E. W. Bliss Co., chairman; C. E. Eggenschwiler, Bunting Brass & Bronze Co., vice chairman; R. C. VanHellen, Unitcast Corp., secretary, and G. J. Grott, Unitcast Corp., treasurer. New directors include Dr. M. F. Browne, Plaskon Co., Gerald Rusk, Freeman Supply Co., and John G. Blake.

The program related to education pertaining to the foundry field, and speakers included Walter T. Scott, coordinator of the school of apprenticeship, and A. C. Schroeder, supervisor of adult education, both of the Toledo board of education; Dr. R. N. Torgerson and R. T. Austin, both from the Industrial Arts Department, Bowling Green University, Bowling Green, O.; George K. Dreher, Foundry Educational Foundation, Cleveland, and I. R. Wagner, president of the AFS. —*Edwin Bremer.*



CHICAGO Chapter of the AFS met Feb. 2. Left to right, top view, are T. J. Magnuson, J. S. McCormick Co., Pittsburgh, and Champion Foundry & Machine Co., Chicago; J. C. Gore, Archer-Daniels-Midland Co., Chicago, and H. G. Schlichter, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago. Center, left to right, appear H. G. Haines, Fred Kasch, Adam Plunge, George Shoeneck, Roy Frazer and Dick Frazer, all of Howard Foundry, Chicago. At the bottom is a general view. Photos by I. H. Dennen, Beardsley & Piper

## Chicago

THE March 2 meeting of the Chicago Chapter, AFS, was designated "Management Night" and guest speaker was Earl L. Shaner, editor-in-chief of *Steel,* Cleveland. For this occasion, the meeting was held at the Del Prado Hotel in Chicago's south side.

Chapter President John H. Owen introduced Fred B. Skeates, general superintendent, Link-Belt Co., who has accepted general chairmanship of the committee hosting the 57th annual AFS convention in Chicago, May 4-8. Col. Skeates announced that all committees had been appointed and are functioning.

Because of the convention, the usual May meeting of the chapter has been cancelled. This has necessitated electing new officers at the April meeting and making nominations at the Mar. 2 meeting. Col. Skeates, a member of the nominating committee, substituted for the committee chairman in announcing the following nominations:

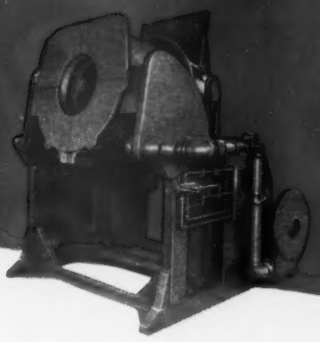
President—John A. Rassenfoss, research metallurgist, American Steel Foundries, and vice president of the chapter this year; vice president—Robert L. Doelman, sales engineer, Miller & Co., and for the past two years chapter secretary; secretary—William L. Rudin, chief engineer, Elesco Smelting Corp.

Directors nominated include: Walter R. Jaeschke, consulating engineer, Whiting Corp.; J. E. Johnson, general superintendent, Continental Foundry & Machine Co.; Roy W. Schroeder, assistant professor of foundry and pattern laboratory, Navy Pier Branch, University of Illinois; and Retiring President Owen.

Chapter Vice President Rassenfoss introduced Mr. Shaner to the audience numbering almost 160 foundrymen and guests.

"Challenges to Business in 1953—Competitive and Otherwise" was the

(*Continued on page* 176)



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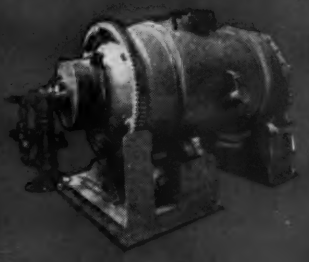

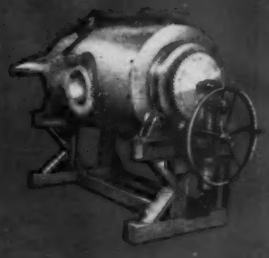

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MICHIANA Chapter of the AFS celebrated National Officers Night at its meeting on Feb. 9. I. R. Wagner, president of the AFS, and A. D. Matheson, a director of the AFS, met with the chapter and spoke to the members concerning national activities. View at left shows President Wagner addressing the meeting. In the bottom view, Stanley Krzeszewski, left, American Wheelabrator & Equipment Corp., Mishawaka, Ind., and Martin J. Lefler, Oliver Corp., South Bend, Ind., talk to Director Matheson about foundry activities

(*Continued from page* 174)

subject the speaker discussed. He mentioned similarities and dissimilarities between the present situation and in 1929 when the Republicans last assumed office. A main difference is that current prosperity is buoyed by artificial conditions. The big problem is to get on the soundest possible basis.

President Roosevelt got prosperity by increasing national debt and devaluating the dollar, at the same time taxing heavily, Mr. Shaner said. President Eisenhower has two choices —to spend or—the hard way—to cut federal government down to its proper size. Included in the latter is that of getting business matters on a sound basis and to give the people greater freedom.

Among factors in the future picture, the speaker mentioned population growth and increase in income, market saturation for goods, mass production—mass consumption, and foreign trade. The latter is a problem which must be tackled head-on, he emphasized.

In concluding, Mr. Shaner threw out the challenge that industry is not yet alert to all that can be done to make free enterprise work better. Public relations he mentioned as one business operation that can be improved.

Next chapter meeting will be held Apr. 6 at the customary place—Chicago Bar Association. Program will be four roundtable sessions.—*Erle F. Ross*

## Michiana

A ROUSING welcome was accorded national AFS president, I. R. Wagner, Electric Steel Casting Co., Indianapolis, and director, A. D. Matheson, French & Hecht Division, Kelsey-Hayes Wheel Co., Davenport, Iowa, by 138 members of Michiana Chapter of the AFS at its Feb. 9 meeting. The dinner and meeting was held at the Morris Park Country Club.

Both Mr. Wagner and Mr. Matheson met with chapter officers and directors during the afternoon and discussed chapter activities and national society affairs. During the evening Mr. Matheson spoke briefly and President Wagner then discussed at length activities of the society.

The meeting then divided into ferrous and nonferrous discussion groups. George Anselman, Beloit Foundry Co., Beloit, Wis., addressed the ferrous foundrymen on "Sand Control." Walter E. Sicha, Aluminum Co. of America, Cleveland, talked to those in the nonferrous session on "Aluminum Alloys—Fabrication and Applications."—*A. J. Rumely Jr., La Porte Foundry Co.*

## Wisconsin

PLANS for the annual Old Timers' dinner of Wisconsin Chapter of the AFS are getting underway under the chairmanship of Charles Zahn. Foundrymen who have been active in the industry for 50 years or more who are not now members of the Old Timers Club will be initiated at the May 8 meeting. Each will receive a bronze and walnut plaque which includes the recipient's name and his industry record.

Apprentices are also invited to attend. Prizes are awarded to those winning first, second or third prizes in the chapter's annual apprenticeship contest for molding and pattern-making entries. First prize is $25, second, $15 and third $10.—*John E. Hubel*

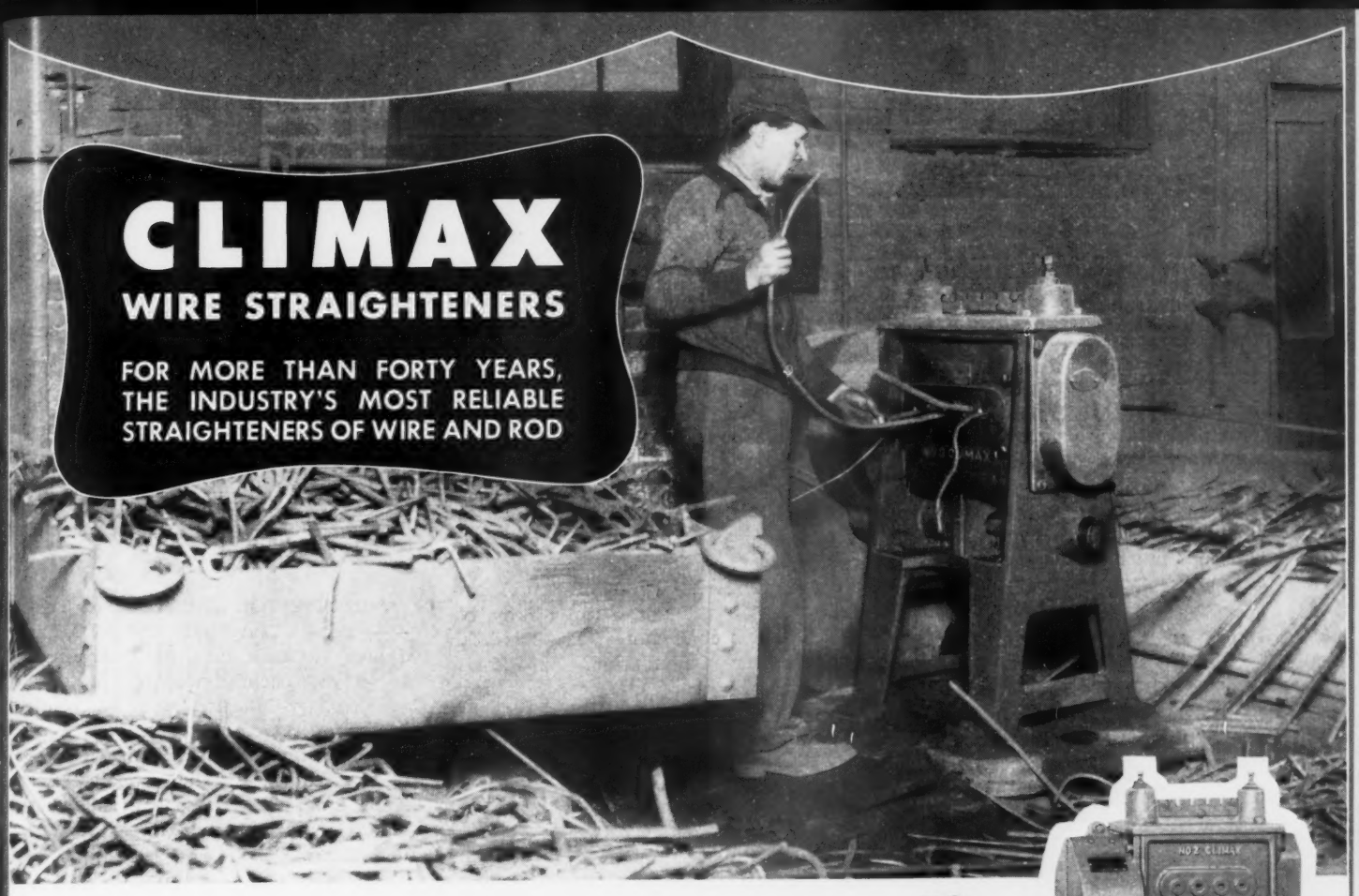
## Metropolitan

DISCUSSION of the shell molding process was arranged by Metropolitan Chapter of the AFS and held at Stevens Institute of Technology, Hoboken, N. J., Jan. 22. Its purpose was to illustrate to foundrymen how they might get started with shell molding production on a jobbing basis, how to make better shells and the process' applications.

First speaker was Al Bzdula, General Electric Co., who explained shell molding's origin and the fact that while several patents have been applied for in the U. S., none has been granted as yet. It is the opinion of the industry that the process can be used by any foundry without fear. However, in the future patents may be granted on specific improvements. The speaker further described the basic process of shell molding and the materials needed. He dealt most specifically with sand and binding agents.

Don Murray, Borden Co., followed with a discussion of resins and the most desirable wetting agent. Borden's experience has been that kerosene is best; however he pointed out that it has been found wetting agents are not absolutely necessary and many foundries are eliminating their use. Various mixing methods and equipment were next described, after which methods and equipment used in sealing the shell were covered. Glue is

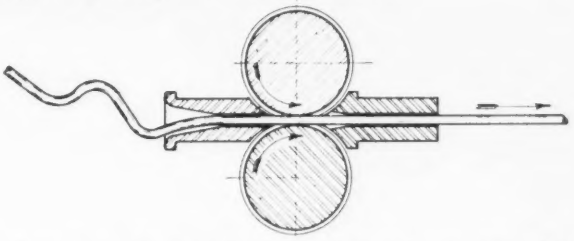
(*Continued on page* 178)



# CLIMAX
## WIRE STRAIGHTENERS

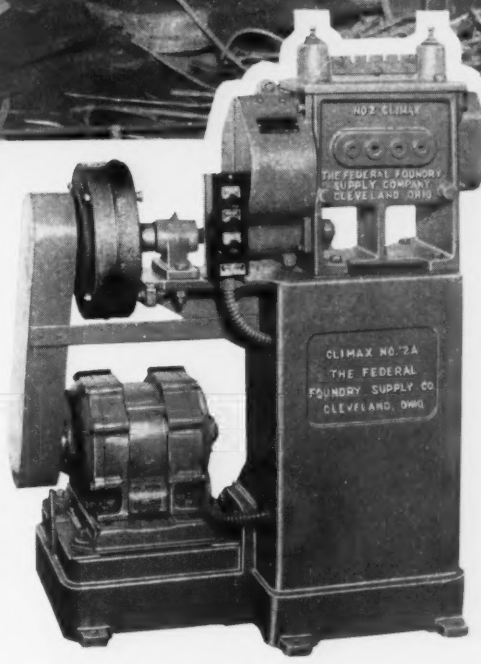
FOR MORE THAN FORTY YEARS, THE INDUSTRY'S MOST RELIABLE STRAIGHTENERS OF WIRE AND ROD

Reclaim your used core rods and wires and save money—with the CLIMAX. Operated safely and efficiently by unskilled labor. Straightens random lengths quickly and economically.



Bent wire is first checked in guide slots at top of the machine to determine proper feed hole, then inserted in feed hole, straightened between two heavy, alloy steel rolls under spring tension and ejected at back with a slight, natural bend, just right for core rod use.

Safety for the operator, as well as long life for the machine, is insured by enclosing gears and other moving parts. On motorized units, V-belts are enclosed and electrical wiring protected. Conveniently mounted controls and a reversible magnetic switch provide full protection for operator and straightening rolls, by enabling operator to stop or reverse machine instantly.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CLIMAX NO. 2A
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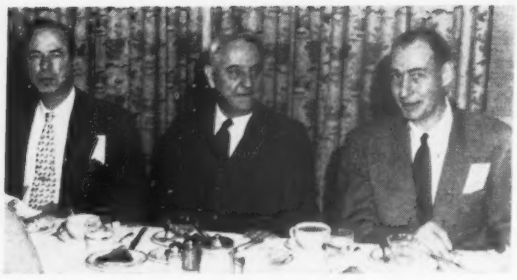


TENNESSEE Chapter of the AFS met Jan. 23 at the Hotel Patten in Chattanooga, Tenn. Dr. James T. McKenzie, center, technical director, American Cast Iron Pipe Co., Birmingham, and national director of the AFS, spoke on chemical changes that take place in cupolas

(*Continued from page* 176)
the most satisfactory and economical method from a production standpoint. Mr. Murray stated that up to 25 lb can be sealed with glue without the addition of shot back-up; however, beyond that point some form of shot back-up must be employed.—*J. L. Ozanne*

## Eastern New York

AT THE FEB. 17 meeting of Eastern New York Chapter of the AFS, "Foundry Manpower Problems in the Tri-City Area" was considered by a panel of educational experts. Meeting was held at the Circle Inn, Lathams, N. Y.

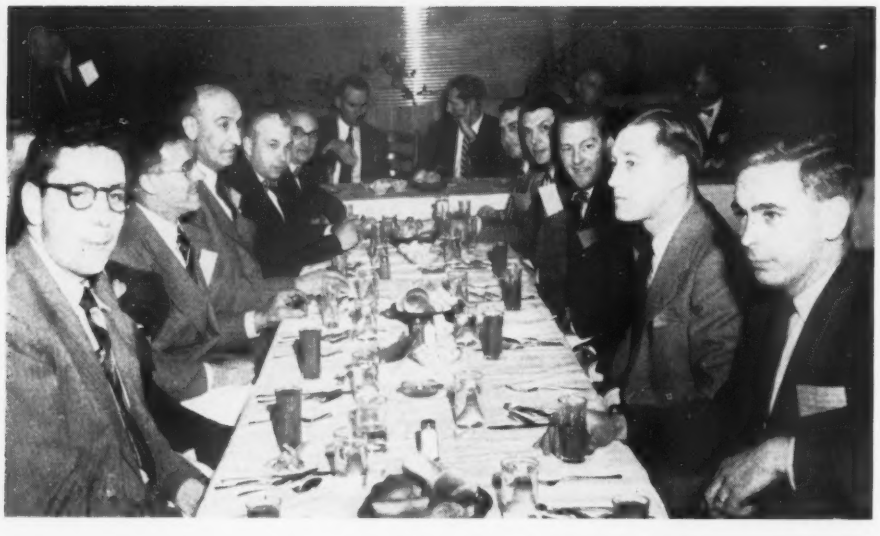
George K. Dreher, executive director, Foundry Educational Foundation, reviewed the progress of the FEF since its inception. Using a motion picture to illustrate his remarks, he was able to show the college aspect of foundry education.

Ray E. Ellis, supervisor of apprentice training, General Electric Co., Schenectady, N. Y., described the problems of industry in attracting foundry apprentices. He was followed by Dr. Allen K. Booth, Rensselaer Polytechnic Institute, Troy, N. Y., who is chairman of Tri-City War Manpower Commission. Dr. Booth briefed the group on the competition being given foundries by other industries in the area.

James Allgeier, supervisor of guidance, Troy School System, then presented facts showing how area high schools could provide foundry training and manpower once the need and requirements were outlined. The aid that state-operated veteran training schools could provide was outlined by William N. Fenninger, chief of Bureau of Trade and Technical Education of the New York state Department of Education.

In conclusion, E. S. Lawrence, General Electric Co., and vice chairman of the chapter, reviewed the results of a foundry employment questionnaire recently sent to foundries in the area to determine the type, number and need for foundry manpower. Result of the meeting was to provide a starting point for an intensive educational program in the area since the need was established and solutions suggested.—*A. J. Kiesler, General Electric Co.*

EASTERN NEW YORK Chapter of the AFS listened to William T. Bean, consulting engineer, Detroit, discuss "Good Design on Purpose" at its Jan. 20 meeting. Top view, left to right, are Mr. Bean and E. S. Lawrence, foundry metallurgist, General Electric Co., Schenectady, N. Y., chapter vice president. Below are some of the members who attended. Photos are by courtesy of Howard Bodwell, General Electric Co., Schenectady



## Tennessee

AT THE Jan. 23 meeting of Tennessee Chapter of the AFS, Dr. James T. MacKenzie, national director of the society, was the featured speaker. Dr. MacKenzie, technical director of American Cast Iron Pipe Co., Birmingham, spoke on "Chemical Changes in the Cupola." He showed slides with charts showing changes in the cupola under various conditions.

The chapter was pleased to announce that its board of directors had set aside a $2000 fund to purchase additional equipment for the foundry department being established at Kirkman Vocational School. Much of the required equipment already has been secured, but additional funds will have to be obtained to complete the program. J. A. Lasater, Combustion Engineering Co., was named chairman of a committee to raise those funds. —*Porter Warner Jr., Porter Warner Industries*

## Detroit

A FATHER and son night was arranged by Detroit Chapter of the AFS for its Feb. 19 meeting. More than 100 members and guests were present at the Detroit-Leland Hotel to hear L. D. Richardson, Eutectic Welding Alloys Corp., discuss "Applications of Low-Melting, Non-Fusion Filler Metals in Foundry Operations."

After presenting a short historical background of the foundry industry and the role that welding plays in it, Mr. Richardson pointed out the following advantages of low melting, nonfusion type welding alloys: They do not have porosity; do not undercut; match base metal; and there are more than 200 alloys designed to provide for every application. Two rods he described in detail included one which has a special metal core covered with a rare earth metal base flux which burns to a high velocity

(*Continued on page* 181)

AJAX

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**CUSTOM** *and* **PRODUCTION**
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● When the pressure is on for lower cost of castings-per-pound, it is a smart idea to cut sand handling costs.

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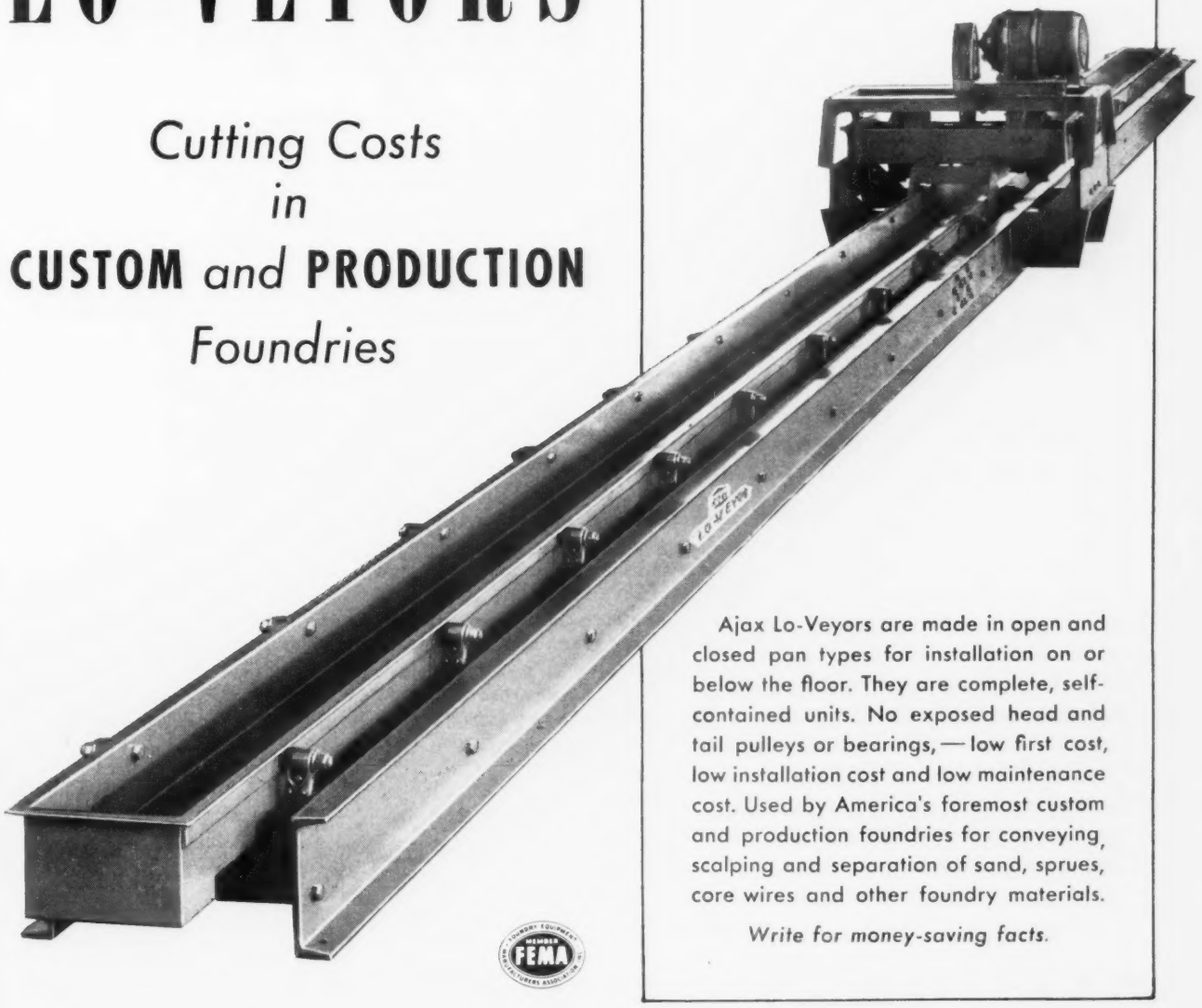

Ajax Lo-Veyors are made in open and closed pan types for installation on or below the floor. They are complete, self-contained units. No exposed head and tail pulleys or bearings,—low first cost, low installation cost and low maintenance cost. Used by America's foremost custom and production foundries for conveying, scalping and separation of sand, sprues, core wires and other foundry materials.

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**HARNISCHFEGER CORPORATION**

**Milwaukee 46, Wisconsin**

CENTRAL MICHIGAN Chapter of the AFS met on Jan. 21. Left to right are Bob Mason, Engineering Castings Inc., Marshall, Mich.; William G. Ferrell, Auto Specialties Mfg. Co., St. Joseph, Mich., speaker, David W. Boyd, Engineering Castings Inc.; and Jack Secor, Hill & Griffith Co., Cincinnati, O.

(*Continued from page* 178)

gas and is used as a cutting agent for all alloys. The other is used to remove cracks and defects in castings without any further preparation for welding. It can remove up to 50 lbs of metal per hour.

Mr. Richardson then described various techniques used in welding gray iron, malleable iron, pearlitic malleable and nodular iron, and he presented slides to illustrate repair work on tools, castings, etc. Harry Gravlin, Ford Motor Co., presented Mr. Richardson with a set of book ends on behalf of the chapter in appreciation of his discussion.—*Walter P. Kantzler, Kelsey-Hayes Wheel Co.*

## Central Michigan

APPROXIMATELY 125 members and guests were present at the Jan. 21 meeting of Central Michigan Chapter of the AFS held at the Hart Hotel, Battle Creek, Mich.

Bob Mason of Engineering Castings served as technical chairman and introduced the principal speaker, William G. Ferrell, vice president, Auto Specialties Mfg. Co., St. Joseph, Mich. His talk described the advantages of control in cupola operations. Mr. Ferrell said control of melting practice not only is possible but is essential to good operations in all foundries regardless of size. To emphasize the point, Mr. Ferrell related how sulphur content of their metal is held to 0.02 per cent.

Close control must be maintained over all phases of foundry operation in order to ship the same kind of castings at all times and satisfy customer demands. And he emphasized the foundry industry as a whole must do better than it has in the past. Mr. Ferrell reviewed briefly the technical progress to date and said that continued industry-wide research and development of both processes and product are necessary to maintain a competitive advantage.—*Don I. Huizenga, Albion Malleable Iron Co.*

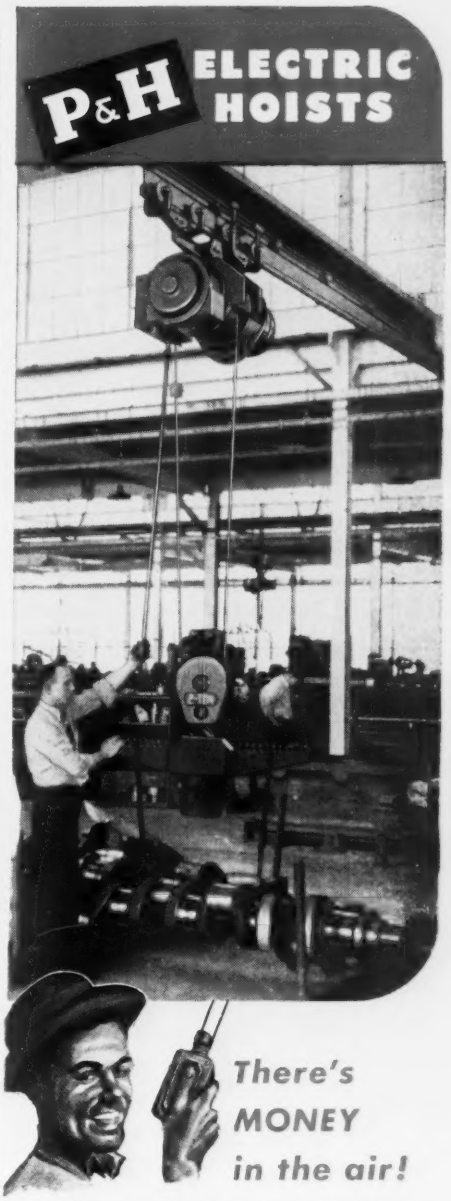
## Northwestern Pennsylvania

A FOUR-DAY sand school has been arranged by Northwestern Pennsylvania Chapter of the AFS. It will be held in the auditorium of Academy High School, 26th and State St., Erie on May 18, 19, 20 and 21 from 7:30 to 10:30 p.m. The sessions will be conducted by Frank Brewster, vice president, Harry W. Dietert Co., Detroit. The auditorium provides space for more than 1000 persons and everyone interested in molding and core sands is invited to attend. There will be no registration charge.

John Finch, General Electric Co., Erie, Pa., a member of the chapter's Educational Committee, is chairman of arrangements and his committee includes Bailey Herrington, Fred Carlson, John Clarke, Roger Griswold, Frank Volgstadt, Joseph Shuffstall and Earl Strick.

Approximately 100 members and guests attended the Feb. 23 meeting, held at the Moose Club, Erie, Pa.

NORTHWESTERN PENNSYLVANIA Chapter of the AFS met at the Moose Club, Erie, Pa., Feb. 23 to hear R. A. Colton (center), Federated Metals Division of American Smelting & Refining Co., New York, discuss "Making Better Castings." At the left is Charles Gottschalk, Cascade Foundry Co., Erie, chapter program chairman. Fred Carlson, Weil-McLain Co., Erie, and chapter chairman, is shown at the right. About 100 members and guests attended

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**HARNISCHFEGER CORPORATION**

MILWAUKEE 46, WISCONSIN

CENTRAL INDIANA Chapter of the AFS met during February to discuss sand reclamation. B. A. Lawson, Harrison Steel Castings Co., Attica, Ind., explained the system used at his plant. Left to right are Mr. Lawson and R. H. Bancroft, Perfect Circle Corp., Hagerstown, Ind., the technical chairman. Photo by Henry Yeager, International Harvester Co.

R. C. Strong, Griswold Mfg. Co., Erie, showed an interesting movie, "Shell Molding," which illustrated how 500 shells per hour could be produced by this method with real production equipment.

Chairman Fred Carlson, Weil-McLain Co., Erie, presided and the featured speaker was R. A. Colton, Federated Metals Division, American Smelting & Refining Co., who spoke on "Making Better Castings." Mr. Colton led an informal discussion which covered such phases of foundry practice as sand, sand control, metals, alloys and their control, melting and melting control. Considerable time was spent in discussing gating and the theory behind the various types of gates.—*Roy A. Loder, Erie Malleable Iron Co.*

EASTERN NEW YORK Chapter of the AFS met Feb. 17. In the top view, chapter Vice Chairman E. S. Lawrence, General Electric Co., Schenectady, N. Y., outlines the results of a foundry manpower survey in eastern New York before an education panel. Seated left to right are James Allgeier, supervisor of guidance, Troy, N. Y., school system; Ray E. Ellis, supervisor of apprentice training, General Electric Co.; W. N. Fenninger, chief, Bureau of Technical Education, State Education Dept.; and Dr. Allen K. Booth, chairman, Tri-City War Manpower Commission. The view at the bottom shows Chapter Director John E. Waugh, General Electric Co., and R. W. MacArthur and D. Burnham, Ramsey Chain Co., Albany, N. Y., engaged in a discussion about manpower problems

## Central Indiana

"SAND Reclamation" was the topic of discussion at the February meeting of Central Indiana Chapter of AFS. Guest speaker was B. A. Lawson, chief metallurgist, Harrison Steel Castings Co., Attica, Ind., who explained the system used in his plant. R. H. Bancroft, executive engineer, Perfect Circle Corp., served as technical chairman and stated that sand reclamation was used by Harrison Steel Castings Co., even though it is fortunate enough to have its own sand supply.

Properties of the sand from the system are important, Mr. Lawson pointed out. Installation of the sand reclamation unit meant the company's sand system had to be revamped. With a completely mechanized system, daily tests are a must and addition of new sand to the system is dependent upon those tests. Present consumption of new sand is 500 pounds per ton of castings produced.

Many savings are being realized in addition to that of sand used in producing castings—for example, improved surface finish as well as a decrease in cleaning costs. A yardstick of this result, Mr. Lawson said, is the 2 to 2½ pounds of welding rod used per ton of casting for the first seven months of the year compared with 15 pounds of welding rod per ton of casting used ten years ago.

Ray A. Witschey, ceramic engineer for A. P. Green Firebrick Co., is scheduled to speak on "Foundry Refractories" at the chapter's Apr. 6 meeting—*William H. Faust, Electric Steel Castings Co.*

## Southern California

REGULAR monthly meeting of Southern California Chapter of the AFS was held Feb. 13 at the Rodger Young Auditorium, Los Angeles. Approximately 120 members and guests were in attendance. W. D. Emmett, Los Angeles Steel Casting Co., presented a report of the California Regional Foundry Conference, which was well attended by members of both the Northern and Southern California Chapters.

The meeting's principal speaker was Charles A. McKeand, director of employee relations, Merchants and Manufacturers Association, whose talk was entitled, "Swallow Your Pride and Make a Profit." He point-

(*Continued on page* 184)

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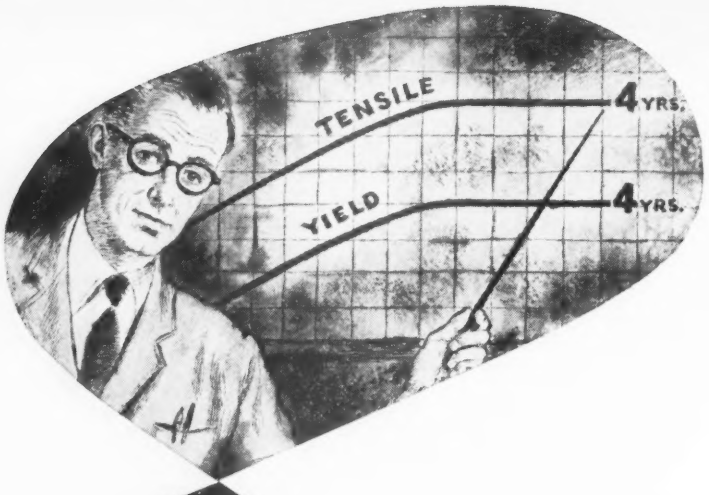


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TENZALOY is a high strength aluminum alloy of the aluminum-zinc-magnesium type. Castings of Tenzaloy have heat-treated properties *without heat treatment.* And they retain these high "as-cast" properties indefinitely.

TENZALOY properties are stable; this is proved by test data taken over a four-year period. These "final" properties can be obtained in any foundry by room-temperature aging for 14 days . . . or by artificial aging for about 10 hours at 250°F.

***Other features of TENZALOY:***

1. Requires no special foundry technique
2. Good castability; produces sharp impressions
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6. Produces silvery-white castings which take high polish
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(*Continued from page* 182)

ed out that many men who advance in responsibility and authority seem to lose sight of the value of ideas suggested by their subordinates on the theory that since now they are "boss" they "know all the answers."

Mr. McKeand urged consideration of the following three basic, human motivating urges: The desire for recognition and acceptance; desire to improve one's status; hunger for human affection. These fundamental goals can be accomplished through proper communication with employees. First, recognition and acceptance can be obtained through proper job training and co-operative supervision. Second, improved status is attained through reward as the employee becomes proficient. Co-operation should be encouraged and opportunity for advancement offered. Hunger for affection is fulfilled through friendships and the attainment of the previous two goals. This in turn is reflected in improved home conditions and better personnel relations on the job.

All these factors have a bearing on profits since as a person is accepted and improves his status, suggestions flow on the improvement of product, surroundings and conditions of the job.

The meeting was concluded with the presentation of the film, "Reporting the Progress of the Foundry Educational Program During Its First Five Years."—*K. F. Sheckler, Calmo Engineering Co.*

## Twin City

GOOD foundry practice in casting light metals and copper-base alloys was discussed by Hiram Brown, chief metallurgist, Solar Aircraft Co., Des Moines, Iowa, at the Feb. 10 meeting of Twin City Chapter of the AFS. He was introduced by Carl Hitchcock, R. C. Hitchcock & Sons, Minneapolis.

Mr. Brown's talk emphasized the need for careful control. This control begins with purchase of scrap of known composition and constant quality, and follows on through the melting practice, sand control and molding techniques. Reactivity of the metals is the criterion in control during melting. A neutral or oxidizing atmosphere is essential to preparation of good quality metal by inhibiting hydrogen porosity. This atmosphere must be continued throughout the life of the molten metal, and the speaker recommended avoiding exposure of the metal stream to air as much as possible during pouring.

(*Continued on page* 186)

## So smooth, so firm, so fully packed . . . Your castings are better, for a fact, when you bond with top quality . . .

# NATIONAL BENTONITE

Many expert foundrymen have been bonding their molds with consistently high quality National Bentonite for years for making smoother, finer-finish castings . . . fewer rejects. The proper proportion of National Bentonite in their formula means a mixture with good green and hot strength, and minimum mold moisture content, that rams and jolts firmly . . . reducing hazards of blows, gas holes, and other surface defects. That's why they say, "I can rely on National Bentonite."

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### FINER FINISH

### CUTS CLEANING TIME

Several factors in the mold making affect the smoothness of the casting finish . . . sand, bonding agent, moisture, with the proper proportions of each in the mold mix formula.

First, of course, is the base sand. To get the best casting finish, a blend of core sand with the finest possible silica or bank sand is recommended. Coarse sand will result in too much metal penetration, for a coarse finish. Next, build up the sand with the minimum quantity of a bonding agent which will combine the necessary green and hot strength with good flowability characteristics, so that the mixture will ram and jolt firmly around the pattern.

A high quality bentonite is recommended for your bonding agent, since it provides a high green, dry and hot strength as well as good flowability for hard ramming. Soft ramming may also result in metal penetration when the mold is poured, with resultant "burn-ins" and other surface defects.

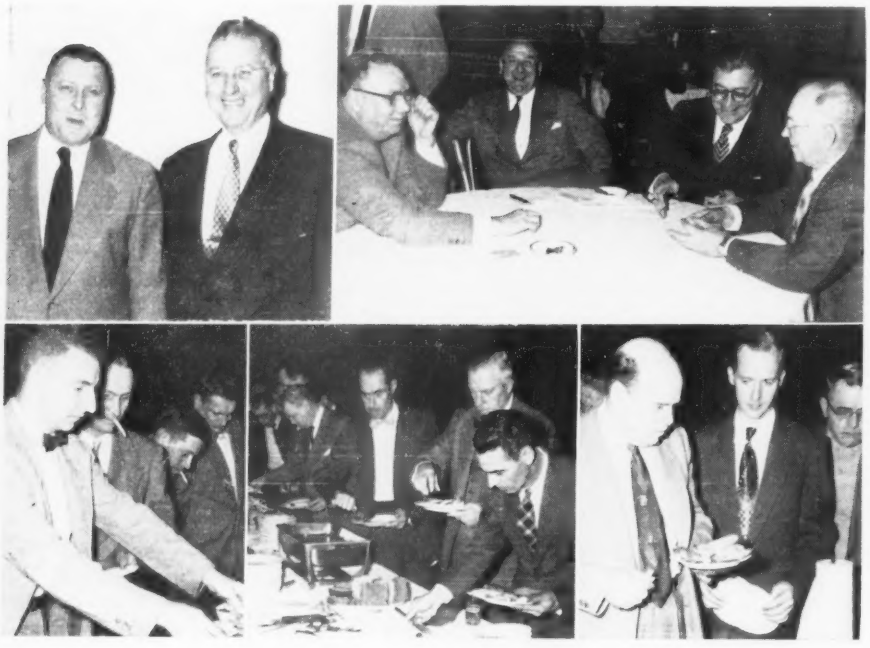
Now, of course, use no more temper water than is necessary for proper sand conditioning. Many of the most common mold defects . . . blows, scabs, burn-ins, pin holes, etc. . . . which mar the surface of the castings can be attributed directly to excessive moisture in the mix.

By keeping the proportion of bentonite as low as possible for the bond strength required, the proper water balance of the mix can be maintained to get the mold properties desired . . . for smoother, finer-finish castings require less time in the cleaning room later.

PHILADELPHIA Chapter of the AFS featured a panel discussion on "Some Causes of Defects in Nonferrous Castings" at its Jan. 9 meeting. Left to right are Robert Hunter, Archer-Daniels-Midland Co., who commented on his firm's movie on cores; J. S. Roberts, American Manganese Bronze Co., Philadelphia, panel member; James Vanick, International Nickel Co., New York, panel member and chairman, Metropolitan Chapter, AFS; Arnold Kraft, foundry consultant, chapter chairman; W. D. Bryden, Philadelphia Bronze & Brass Corp., Philadelphia, vice chairman and discussion leader; and B. A. Miller, Baldwin-Lima-Hamilton Corp., Philadelphia, panel member and former chapter chairman. Photo by Leo Houser, Dodge Steel Co., Philadelphia

(*Continued from page* 184)

Use of generous risers and gates was recommended by Mr. Brown to assist rapid and complete feeding of the molten metal in the mold. Insulated sprues will help cut down the size of the risers. Use of chills in front of the gates is to be avoided, although the speaker stated he has found this practiced by many foundries. He then cautioned that test bars are not indicative of the type of metal in the casting since different gating systems between the casting and the test bars affect the quality of the metal. This is particularly true of the light metals. Mr. Brown believes that keeping good records in the technical departments and cooperation between the foundryman, technical personnel and shopmen cannot be emphasized too strongly.



CHESAPEAKE Chapter of the AFS held its annual oyster roast Saturday, Jan. 10. Top row, left to right, are M. J. Kelly, president, Kelco Corp., Baltimore, and A. A. Hochrein, district manager, Federated Metals Division, American Smelting & Mining Co., Baltimore, who were co-chairmen of the roast. Top view right shows a group of guests from the Philadelphia Chapter. Bottom scenes show members at the raw oyster and cold cut bars

Another Castings Defects Committee meeting was held at the research laboratory of Archer-Daniels-Midland Co. on Feb. 24. These are under the direction of Nate Levinsohn, foundry superintendent, Minneapolis-Moline Co. Those attending report excellent benefits from the roundtable discussions.

The chapter's Educational Committee, under the direction of J. D. Johnson, Archer-Daniels-Midland Co., arranged a second plant visit Feb. 17. Host foundry was Minneapolis-Moline Co., and the trip was designed to introduce students and apprentices in the area to the Twin Cities' foundry industry.—*R. J. Mulligan, Archer-Daniels-Midland Co.*

## Philadelphia

A SERIES of educational roundtable discussions have been arranged by the Philadelphia Chapter of the AFS. Covering steel, iron, brass and bronze foundry practice, the meetings are held 7:30 to 9:30 p.m. in the Engineers Club, Philadelphia. Concluding sessions are Apr. 13 for brass and bronze; gray iron, Apr. 17; and steel, Apr. 24. Each group has met monthly since January. The series was arranged under the direction of H. E. Mandel, chairman, and Edwin Zeeb, co-chairman of the chapter's educational committee.

At the chapter's regular February meeting, W. S. Pellini, Naval Research Laboratory, Washington, was the principal speaker. Mr. Pellini summarized the extensive work which the laboratory has done on the problem of feeding range of risers. Mr. Pellini believes the casting rather than the riser is the primary factor in determining the distance to which risers feed to soundness. He pointed out that feeding range as related to centerline shrinkage should not be confused with riser sufficiency as related to the elimination of under riser shrinkage. This last factor is a question of freezing time of the riser compared with that of the casting proper.

A riser may be entirely sufficient to prevent under riser shrinkage but because of casting geometry, such as uniformity of the section, may feed to soundness for very short distances. Increasing riser size is of no help in such a case. Mr. Pellini's discussion was a preview of the presentation he will make as the AFS official exchange paper to the International Foundry Congress in Paris next September.

The chapter has arranged a Management dinner meeting for Apr. 21 to be held at the Barclay Hotel. The speaker will be S. M. Jenks, vice

(*Concluded on page* 189)

...OR SMALL

*We make them All!*

INTERNATIONAL MOLDING MACHINE COMPANY

LA GRANGE PARK, ILLINOIS

The International Line is designed by experienced foundry engineers who have a practical working knowledge of the problems of the industry.

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**RIGID CONSTRUCTION** from our proven corner design, permits less weight with no loss of strength.

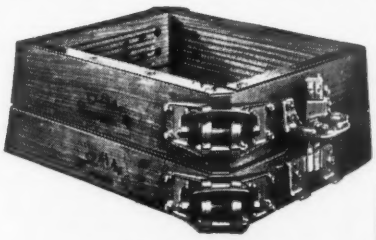
**SOLID CORNERS** are of the same design used on Adams Aluminum Slip Flasks. This interlocking tongue-and-groove construction is retained in perfect alignment with bolts secured through tapped end sections and locked with washers and nuts. Important! This construction has proved far superior to other forms of corner design.

**MALLEABLE TRIMMINGS** are used on Adams Aluminum Easy-Flasks as on all other flasks we manufacture.

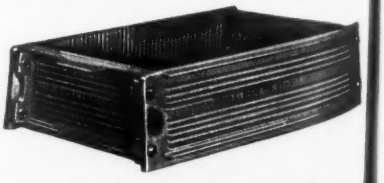
**OPERATING MECHANISMS** are identical with those used on the Adams Cherry Easy-Off Flask and incorporate the same simple adjustment and reversal of locking position.

**ALUMINUM PROTECTING STRIPS** are standard equipment at top of cope and bottom of drag. Steel strips available upon request at no extra charge.

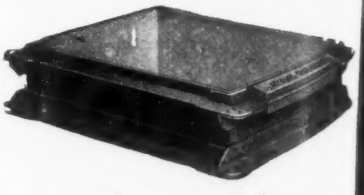
**HANDLES AND TRUNNIONS** are available when specified . . . at extra charge.



Adams Cherry Easy-Off Flask



Adams Jackets, Cast Iron or Aluminum



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# The ADAMS Company

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**MOLDING MACHINES and FLASK EQUIPMENT**

**DUBUQUE, IOWA, U.S.A.**

(*Concluded from page* 186)
president of manufacturing, United States Steel Corp.—*D. E. Best, Brass Foundry, Bethlehem Steel Co.*

## New Jersey

More than 90 foundrymen turned out to hear W. J. Sommer and J. C. Alberts, both of the Plainville Casting Co., Plainville, Conn., and Westfield, Mass., speak at the Military Park Hotel, Newark, N. J., Jan. 19. The meeting was sponsored by the New Jersey Foundrymen's Association. Mr. Sommer discussed quality control in a small foundry, and Mr. Alberts spoke on good merchandising as the key to profitable operation.

## New England

MEMBERS of the New England Foundrymen's Association met at the University Club, Boston, on Feb. 11 to hear Chester V. Nass, vice president, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago, discuss "Mechanization in Foundry Molding." Newly elected President Joseph B. Stazinski, General Electric Co., announced during the business meeting that the group's annual "Fun Night" would be held in June rather than at the annual meeting in January as has been the practice in past years.

Mr. Nass presented an interesting motion picture illustrating molding mechanization in several foundries throughout the country. At the conclusion of the film, Mr. Nass announced that Beardsley & Piper is preparing a similar film on core making.—*Myron DeHollander, General Electric Co.*

## Central Ohio

ASPECTS of Nodular Iron," were reviewed by Thomas Eagan, research metallurgist, Cooper-Bessemer Corp., Grove City, Pa., at the Feb. 9 meeting of Central Ohio Chapter of the AFS held at the Seneca Hotel, Columbus, O. Since Cooper-Bessemer has been one of the major producers of nodular iron as well as one of its users, Mr. Eagan was able to evaluate the material from an engineering standpoint. Thousands of tons have been produced.

Mr. Eagan feels that nodular iron is a new engineering material having its own type physical properties. In general, it is superior to malleable iron and gray iron, but below steel as far as tensile properties are concerned. As such it takes a place somewhere between these well known ferrous materials.—*Wilfred H. White, Jackson Iron & Steel Co.*


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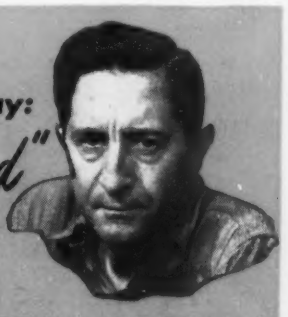

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# ILLINOIS UNIVERSITY CONFERENCE

## *Stresses Health and Safety Betterment*

By EDWIN BREMER
*Metallurgical Editor*
*FOUNDRY*

CONFERENCE on foundry safety, health and air pollution, sponsored jointly by the department of mechanical engineering, University of Illinois and the American Foundrymen's Society, was held at the university, Urbana, Ill., Feb. 17, 18 and 19.

Opening session was the showing of a colored motion picture, "The Invisible Shield," presented through courtesy of Claude B. Schneible Co., Detroit. This film depicts modern installations for removal of dust and fume as well as providing adequate ventilation without drafts and with low building heating loss.

At a following luncheon Prof. N. A. Parker, head of the department of mechanical engineering, University of Illinois, presided. Dr. C. M. Louttit, associate dean of the graduate college, welcomed those present, and mentioned that such conferences benefit the university as well as industry since they acquaint the faculty with industry's problems and broaden its viewpoint.

In the afternoon session Dr. Robert E. Savage, International Nickel Co., New York, discussed safety practices in the production of ductile iron. He pointed out that the problems are burns from metal splash, fumes, light and heat—all caused by addition of magnesium-bearing alloys to molten iron. However, these dangers can be obviated by a few precautions.

Fumes and heat can be alleviated by hooding the operation in a segregated area. Interposing a large steel plate shield between operators and ladle also helps minimize the effect of metal splashing. Operators, of course, should be equipped with suitable fire-resistant clothing, face shields and goggles with red filter lens.

Herbert Weber, American Brake Shoe Co., Chicago, spoke on effect of resin and other fumes in shell molding. He said that silicone release agents should be the non-hydrolizing type of a low order of toxicity. If any dilution is required, carbon tetrachloride should be avoided since it tends to decompose on hot surfaces, possibly generating phosgene gas which is extremely poisonous. Suitable diluents include ethyl methyl ketone, toluol, and acetone.

Fumes from phenol and urea formaldehyde resins appear to be a nuisance rather than a hazard. Resin dusts may cause irritation and dermatitis. Bare hands should not be used in handling resin since perspiration causes it to stick to the skin. He said he found that a protective cream which forms a hard film gives good results for an appreciable period.

William N. Davis, director of safety, hygiene and air pollution, American Foundrymen's Society, Chicago, in discussing safety training in the foundry pointed out that less than 15 per cent of the accidents are due to equipment and plant layout. Remaining 85 per cent is due to the human element, and undoubtedly results from improper or no training. Mr. Davis said the foreman is the man to train operators, but satisfactory results are obtained only when the foreman is trained properly and sold on safety principles. The speaker advocated regular meetings of those entrusted with the safety programs.

At 4 p.m. the group boarded busses and made a trip to Danville, Ill., about 40 miles away, to visit the Central Foundry Division, General Motors Corp. Group was divided into parties of five, and with guides made an extended tour of both gray iron and malleable iron foundries.

Wednesday morning's sessions covered several phases. H. Downing, Lincoln Electric Co., Chicago, spoke on welding hazards and pointed out that except in the case of zinc and cadmium coated materials, fumes from welding operations are not dangerous. Skin burns from radiant energy or from hot metal can be prevented by adequate protective clothing, gauntlets and face shields.

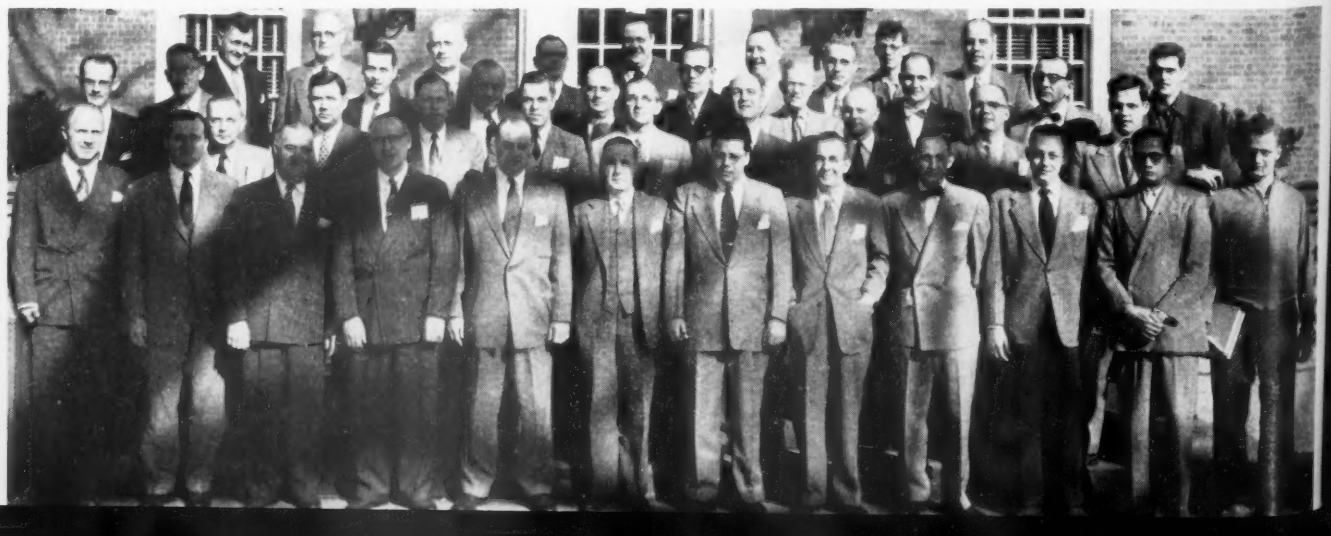
S. C. Rothmann, John Deere Co., East Moline, Ill., talked about labeling hazardous materials, and drew attention to U. S. Department of Commerce Tariff No. 4 and the Manufacturing Chemist's Association bulletin L-1 which provide the necessary information. In some cases it may be necessary to obtain from manufacturers or suppliers, data on the ingredients of materials so that proper labeling may be done. Labels should contain the name of the product or material; proper signal or codeword such as "danger," "warning" or "caution"; statement of hazard; precautionary measures, and instructions in case of the latter.

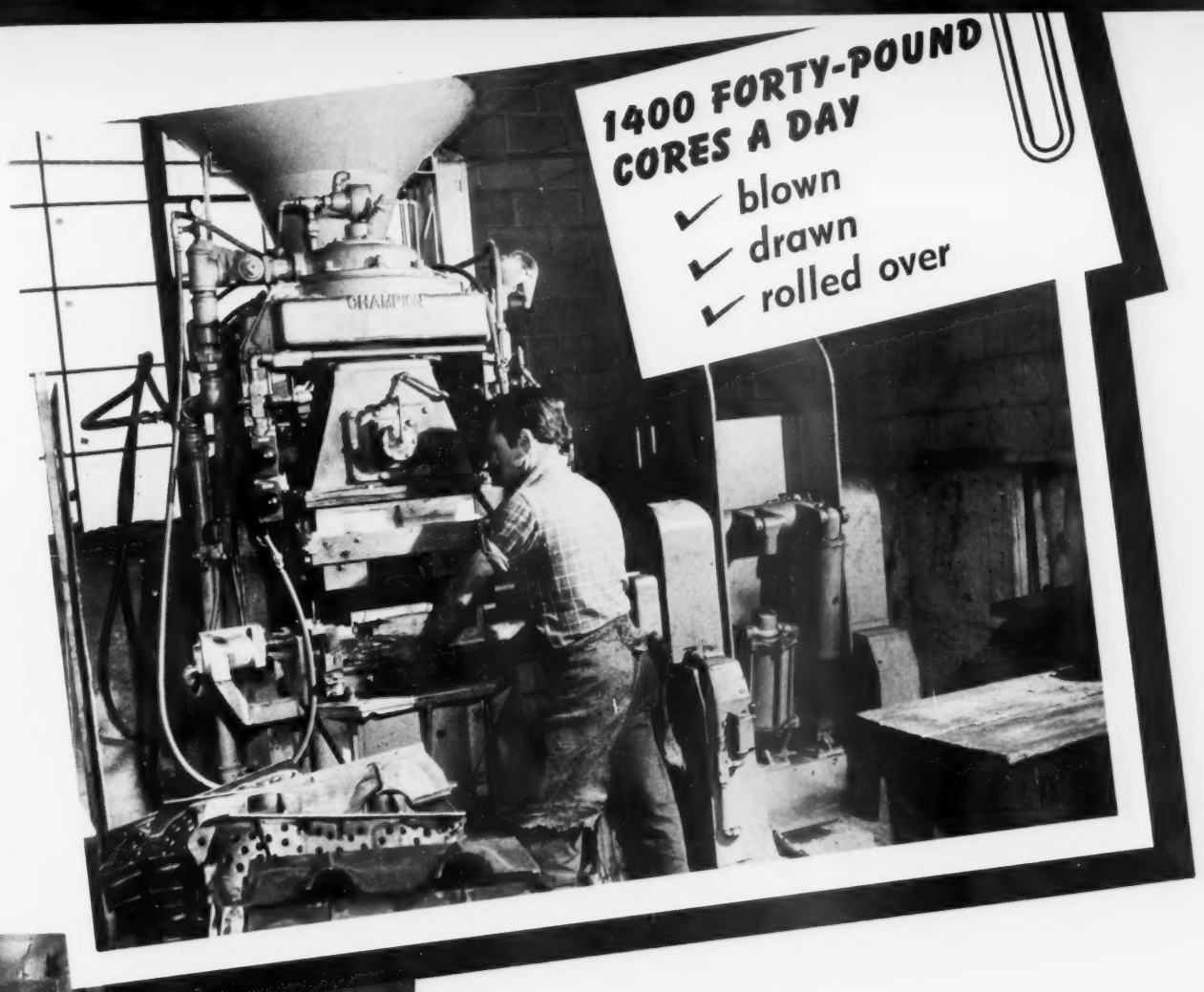
Ray Moore, Claude B. Schneible Co., Detroit, discussed practical control methods of foundry air pollution, and described the application of fractionating hoods. These bring in air from the outside and distribute it in the form of an air curtain in front of the exhaust hoods. This confines the dust to the hood and cuts down entrance of room air to about 20 per cent of the total volume being exhausted.

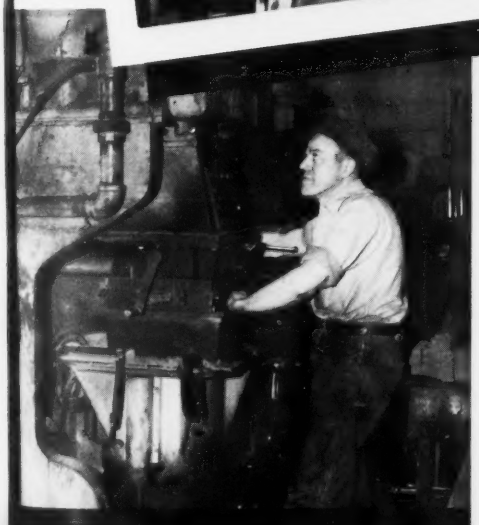
Prof. John O. Kraehenbuehl, University of Illinois, speaking on the

(*Concluded on page* 193)

Representatives from nineteen foundries located in seven states attended the Illinois conference

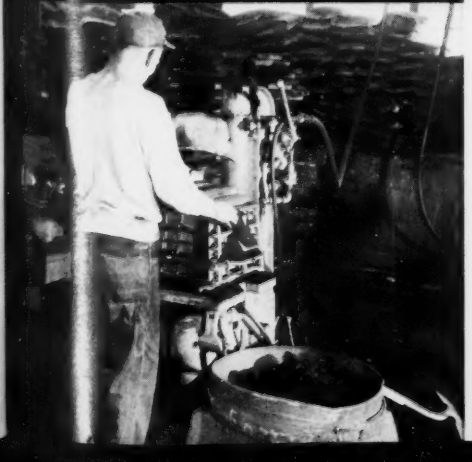




Six Champion Core Blowers keep Newnam's core room running at top capacity.

A worker jolts a small mold on one of Newnam's twenty Champion Jolt Squeezers.



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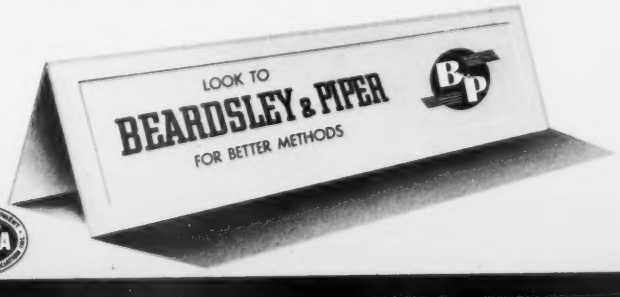
For your toughest core blowing jobs—choose Champion. You will find that these rugged Champion Blowers pay off in your core room, just as Champion Molding Machines pay off on your molding floors. Write today for specifications and prices. *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*



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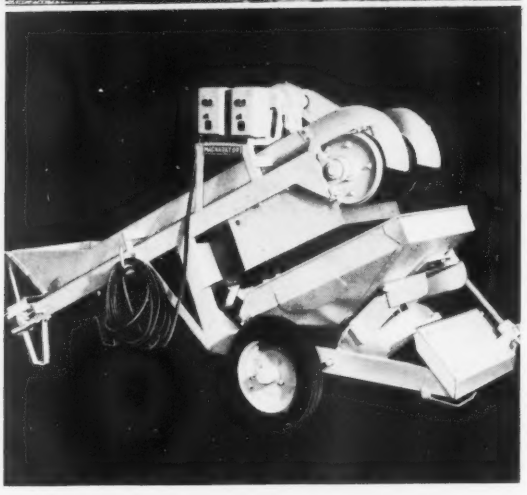

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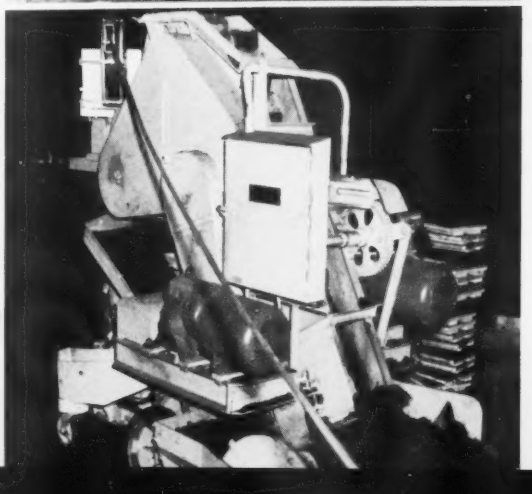

**The Nite Gang**

- Screening and aeration
- Directed discharge

**plus**

- Capacity of 50 tons per hour
- Magnetic separation
- Self-loading
- Self-propelling
- Automatic cable reel
- Hydraulic elevator tilt

LOOK TO
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FOR BETTER METHODS

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(*Concluded from page* 190)

noise problem said that one of the first requirements is to make an instrument survey to determine the sources and loudness. Repair of equipment and isolation of vibrations aid in reducing noise to satisfactory level. High noise levels result in more accidents since the reaction time of the individual is decreased.

At the afternoon session Dr. L. E. Hamlin, American Brake Shoe Co., Chicago, talked about silicosis and siderosis. He said that dusts 0.5 to 3 microns in size are the most dangerous since they can enter the lungs. In itself silicosis is not necessarily fatal, but it often is accompanied by complicating infection. X-rays of lungs alone are not valid for determination of silicosis since the type and length of exposure are important.

Dr. Lynn D. Wilson, Wilson Industrial Hygiene & Research Laboratory, Chicago, described dust and fume sampling methods, and Nelson W. Hartz, Mine Safety Appliance Co., Pittsburgh, exhibited a number of instruments for measuring air pollution, and demonstrated their operation.

At the dinner held at the Urbana-Lincoln Hotel, Urbana, I. R. Wagner, president, AFS, pointed out that the prime purpose of accident prevention is to protect the employee, but in so doing, the foundry or plant benefits by better production at lower cost.

Thursday morning K. M. Smith, Caterpillar Tractor Co., Peoria, Ill., described the importance of maintaining foundry ventilation equipment. He pointed out that the equipment should be rugged in design, and arranged for accessibility. Regular checking and attention will eliminate breakdowns. Dr. Floyd VanAtta, National Safety Council, Chicago, discussed dermatitis in foundry operation, and advocated plenty of soap and water as an excellent preventive.

Prof. G. W. Harper, University of Illinois, in speaking about safe practices in materials handling, said that about 25 per cent of industrial accidents occurred in materials handling. Reason for such high incidence is the extent of materials handling in industrial production. For example, 150 to 200 tons of material are handled to produce 1 ton of castings. Hence, careful attention should be given to prescribing safe practices, and seeing that they are enforced.

Final discussion of the conference was by F. P. Streiter, Dow Chemical Co., Midland, Mich., on storage, handling and use of magnesium. Conference concluded with a luncheon at which those in attendance were presented certificates indicating they had completed the course on foundry safety, health and air pollution.


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**HERE ARE ONLY 5 PLACES** "where" and 5 reasons "why" CYCLONE Hoists can help your men get lifting jobs done safer, quicker, with less physical effort. Increase labor-dollar return.

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**"HERC-ALLOY" LOAD CHAIN**—Famous "HERC-ALLOY" welded steel load chain provides complete flexibility. Non-kinking. Safer. Longer life.

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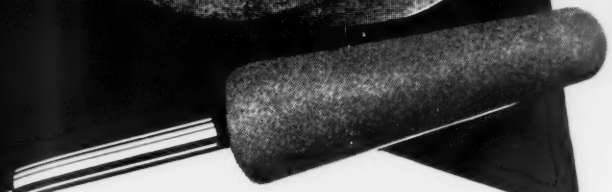

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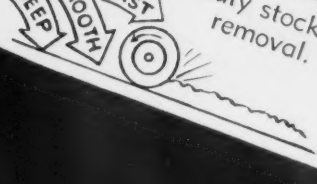


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# WISCONSIN FOUNDRYMEN HOLD CONFERENCE

## *Discuss Industry Trends and Developments*

By FRANK G. STEINEBACH
*Editor, FOUNDRY*
ERLE F. ROSS, *Chicago Editor*
*FOUNDRY*

THE 16th annual regional foundry conference, at the Hotel Schroeder, Milwaukee, Feb. 12-13, was another in a long list of successful meetings staged jointly by the Wisconsin Chapter of AFS and the University of Wisconsin. Attendance during the two-day series of technical meetings exceeded 700. The opening meeting featured talks by I. R. Wagner, president of AFS and Dean M. O. Withey, College of Engineering, University of Wisconsin, Madison, with J. G. Risney, Risney Foundry Equipment Co., Milwaukee, and president of the Wisconsin Chapter, presiding. Mr. Wagner, speaking on "A Conference for the Casting Industry," pointed to the opportunities for young men in the foundry industry now, outlined many of the activities of the AFS and stated that the society's program is modern and progressive.

In discussing, "Some Major Problems in Engineering Education," Dean Withey indicated that every possible means must be used to lessen the shortage of engineers during the next few years. He pointed out that only 40 per cent of entering freshmen eventually graduate, and then discussed ways to provide better selection and admission procedures and greatly improved counseling. He discussed some of the present pressures toward a five-year program in engineering education, or the broadening of the scope of training the engineer, but he felt such procedures would add too much to the cost of this kind of education. Since education continues after graduation, he suggested, additional study perhaps could be done better while graduates are working in industry.

In a provocative talk, "Their Health Is Our Business," Walter F. Scholtz, Allis-Chalmers Mfg. Co., Milwaukee, indicated that previous efforts toward employee safety have not been enough and that health also is an important factor in employee relationships. He classified hazards as chemical, physical and biological. Industry, he pointed out, has done a good job in controlling dusts, but many hazards causing skin damage must be taken into account. He then outlined a number of conditions that occur in industry and indicated how they can be corrected. In his opinion, every foundryman must watch for known irritants and take proper steps to eliminate them.

Technical sessions were devoted to steel, gray iron, malleable iron, nonferrous and patternmaking. William S. Pellini, Naval Research Laboratory, Washington, discussed "Strain Theory of Hot Tearing" at the steel session, with E. Tetzlaff, Pelton Steel Casting Co., Milwaukee, presiding. According to Mr. Pellini, hot tearing in steel, as well as other metals and alloys, is due essentially to length of time liquid films around grain boundaries exist during solidification. If the period is short, such as a matter of seconds, contraction and extension forces causing strain do not have the opportunity to become operative. However, when the liquid film condition exists for minutes, those forces can function, and since the liquid film has no strength, a tear results. In his discussion Mr. Pellini described the study leading to proof of the strain theory of hot tearing, details of which were presented in the November, 1952, issue of FOUNDRY.

Improved finish, better casting contour, low scrap and other desirable qualities in gray iron castings in a wide range of section thicknesses obtained by use of a single sand were described by Joseph S. Schumacher, Hill & Griffith Co., Cincinnati, at the gray iron session. C. W. Schwenn, Brillion Iron Works Inc., Brillion, Wis., presided.

Being used by over 30 foundries with success, the sand is essentially a 4-screen type composed of 60 per cent lake and 40 per cent bank sands. Lake sand showed about 95 per cent distribution on the 50 to 100 mesh screens; bank sand had the same percentages distributed on the 70 to 200 mesh screens. Resultant mixture provided 92 per cent distribution on 50 to 140 mesh screens. Sand is used with 6 per cent bentonite and 2 per cent proprietary carbonaceous facing additive. With heavy castings having increased section thickness, more bentonite and facing additive are used.

The malleable session featured a discussion by Frank S. Brewster, Harry W. Dietert Co., Detroit, on "How To Get More Production with Controlled Sand," with K. Grob-

(*Continued on page* 198)

Wisconsin Chapter President Joseph G. Risney, Risney Foundry Equipment Co., Milwaukee, discusses the conference program with national president of the AFS, I. R. Wagner, center, Electric Steel Castings Co., Indianapolis, and Dean M. O. Withey, right, College of Engineering, University of Wisconsin

# When the horseless carriage was first scaring horses . . .

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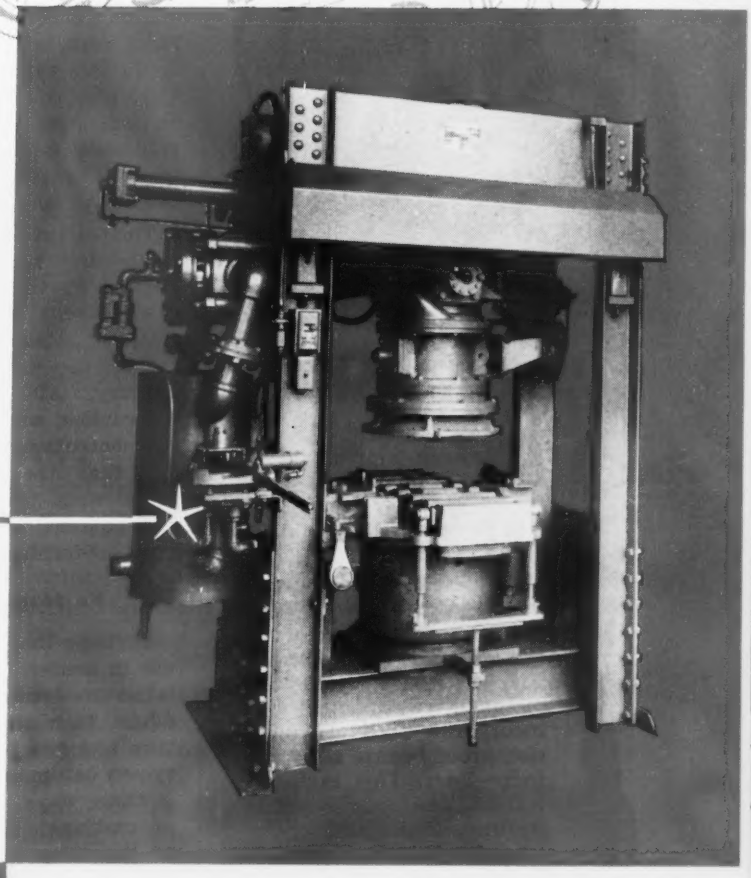

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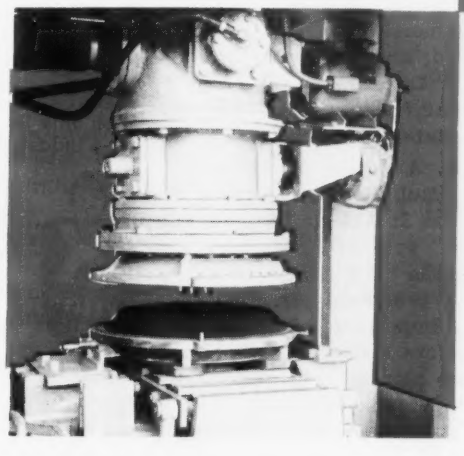
The 103 is a stationary magazine type core blower, capable of blowing ANY core or molding sand. Two sizes are available — the 103 for cores up to 50 pounds and a larger model called the 104 designed to handle cores up to 250 pounds. Hand or automatic operation, six second cycle — the latest and best in core blowers!



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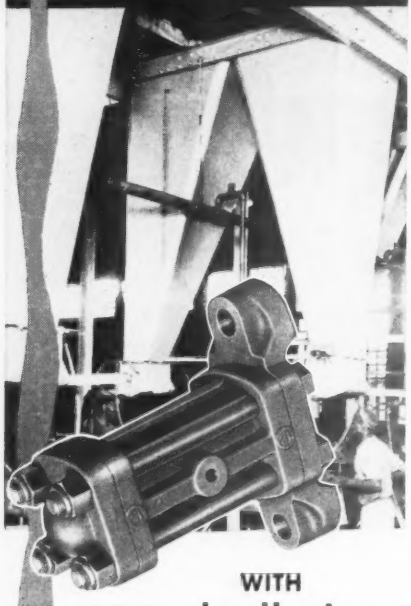

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(*Continued from page* 196)

schmidt, Badger Malleable & Mfg. Co., South Milwaukee, Wis., presiding. After indicating that sand control is a potent means of increasing production, and discussing improvements that can be made through such controls, Mr. Brewster explained how to set up a practical sand control program.

He indicated that moisture, permeability, green strength and deformation should be determined at half-hour to hour intervals in a medium or large plant. Most of the other control tests should be run daily or twice weekly, according to the speed with which any property can change. The most desirable condition would be to have a record of each batch, indicating moisture, strength, deformation and possibly permeability. This goal is near since equipment to do this type of testing automatically now is available. In conclusion, he indicated that under no circumstances should the responsibility for molding materials be assigned to more than one man.

The fracture test should be of prime importance to foundrymen, declared George P. Halliwell, H. Kramer & Co., Chicago, in a paper, "Fracture Test of Melt Quality." Carl Van Buren, superintendent of the brass foundry, Allis-Chalmers Mfg. Co., Milwaukee, was chairman. To bolster his contention, Mr. Halliwell pointed out that the fracture test, which deals with chemistry of the melt, gas content, etc., is standard practice in ferrous metallurgy.

### No Standard Test Exists

Perhaps the reason for its lack of use in nonferrous casting is that the latter involves more metals and more alloys. In addition, no standard fracture test has been developed. Foundrymen can make good use of the test in these ways: (1) in the engineering of castings; (2) as a rough check of the alloy in hand in some jobs; (3) as a post mortem of castings which have failed; and (4) as a test for melt quality. Discussion brought out the point that fractures must be examined immediately.

J. W. Costello, American Hoist & Derrick Co., St. Paul, discussed "Pattern Equipment as It Affects Foundry Equipment" with H. Wesley Stokes, Waukesha Foundry Co., Waukesha, Wis., presiding. Mr. Costello stressed the importance of checking drawings before starting pattern production. Some plants have organized committees, including the foundry superintendent, pattern supervisor and metallurgical engineers, to review drawings before construction.

The speaker recommended the use


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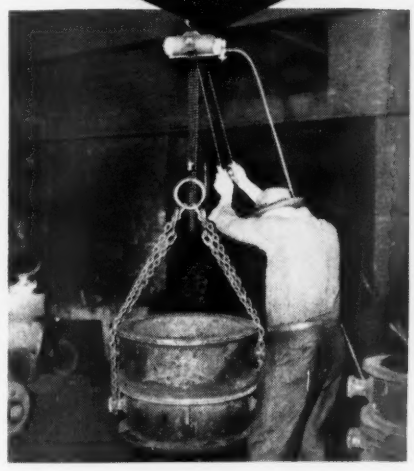

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of wood models to permit those in charge to visualize design and determine how it can be adapted best to foundry equipment to be used. Since the average foundry is mechanized for large scale production, pattern equipment must be well constructed and able to stand wear and tear of present methods.

In the second round of technical sessions, Clyde Wyman, Charles Fuerst and George DiSylvestro, Burnside Steel Foundry Co., Chicago, presented in some detail the results of a study conducted for the purpose of evaluation of core sand binders used in the steel foundry. D. Bosma, Bucyrus-Erie Co., South Milwaukee, Wis., presided.

### How Steel Melts

At the gray iron session, Daniel Krause, Gray Iron Research Institute, Columbus, O., discussed "How Iron and Steel Melts in the Cupola," with Harold W. Schwengel, Modern Equipment Co., Port Washington, Wis., presiding. Mr. Krause reported on two investigations of a cupola melting process, with special emphasis on the behavior of steel in the charge. These investigations showed that long pieces tend to assume a vertical position as they descend the stack. The surface of steel pieces picks up sulphur shortly after the steel has been charged into the cupola, penetration being small, but concentration reaching as high as 0.50 per cent sulphur or higher at some distance above the bed. This condition tends to decrease as the steel reaches the melting zone. Results also show that steel descends farther into the bed before melting than pig iron or cast scrap. Whereas pig iron and cast scrap melt rather suddenly after reaching a mushy stage, steel gradually melts from the outside by the washing action of molten iron and carburization of the very hot coke.

"Snagging at Its Best" was discussed by Russell L. King, Bay State Abrasive Products Co., Chicago, with Joseph G. Kropka, Chain Belt Co., Milwaukee, as chairman. The speaker commented that snagging practice has advanced greatly because of the availability of better wheels and the investigations by foundrymen to improve it.

Mr. King covered specification specialization, grinding wheel markings and standardization, simplified specifying and wheel manufacturing controls and suggested simplified test procedure. In connection with the latter, the speaker said there are many simple and detailed methods to evaluate effectiveness of a grinding wheel specification. He suggested a "down the middle" meth-


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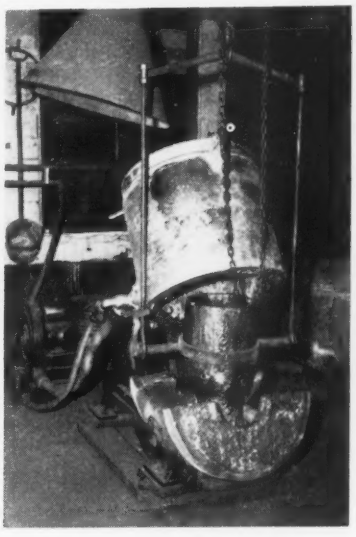
## How To Do It ...

# Device Gives One Man Complete Control of Crucible Handling

By ALEXANDER C. OSBORN
Osborn Bronze Works
Clarksburg, W. Va.



ONE-MAN removal of a No. 70 crucible of bronze from a furnace and pouring its contents is made possible by a unique device developed by the author who is shown pouring ingot molds at his foundry.

In preparation for melting, the crucible and shank are placed in the furnace and the latter is lowered to melting position below the split hearth. Then the hearth is closed and the furnace shell lowered. When the melt is ready to be pulled, the furnace shell is raised vertically about 10 in. before action of a cam tilts the shell by pulling back the cantilever, which in turn operates a gear that opens the split hearth. The elevating mechanism is operated by an 8:1 ratio spur gear assembly, and the furnace is raised and tilted by four complete turns of a crank.

Crucible is removed from the furnace by the shank attached to a chain hoist with a bail. To permit one-man pouring, an elongated handle is inserted into a slot cast in the back of the shank and held in place by a self-engaging ratchet. As shown in the pouring view, the pouring arm has a convenient "D" type handle with a protective shield to reflect heat of the melt away from the operator's hand. At the end of one of the shank pivot arms is a short vertical bar with a U-shaped, hinged finger at the top. It fits over a rod of the bail to prevent the crucible from tipping during transport.

**Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $10 for each idea submitted and published. Send a photo or drawing with your idea**

od that employs a minimum amount of time and effort, yet maintains reasonable accuracy.

George W. Anselman, Beloit Foundry Co., Beloit, Wis., discussed "Sand — Synthetic-Natural-Semisynthetic," with Otto Sadofsky, Kenosha Brass & Aluminum Foundry, Kenosha, Wis., presiding. The speaker described the three types of sand and suggested where to use them and why.

Natural sand, he said, is dug in natural bond combination and cannot be reproduced without a lot of mulling. With semisynthetic, grain size control must be used. This sand can be employed with modern molding equipment, but its proportions must always be kept the same, and the foundry using it must have ample muller capacity and plenty of handling equipment. Full synthetic sand, Mr. Anselman continued, requires a very considerable amount of handling equipment and manpower. In other words, it needs a fully equipped system. The speaker's belief was that semisynthetic sand is probably the most satisfactory for many operations.

Elmer Blake, Osborn Mfg. Co., Cleveland, spoke on "Design of Coreboxes and Driers for Use on Core Blowers." H. Arneson, Spring City Pattern Works Inc., Waukesha, Wis., presided. The speaker pointed out that the trend in coreblowing is toward automatic equipment that produces quality cores economically. Such equipment requires properly designed and constructed coreboxes and driers. Mr. Blake suggested basic fundamentals of design and equipment requirements which he considers necessary for blowing good cores. He outlined points to be considered in designing and procedures to be followed in construction of equipment for blowing a given core.

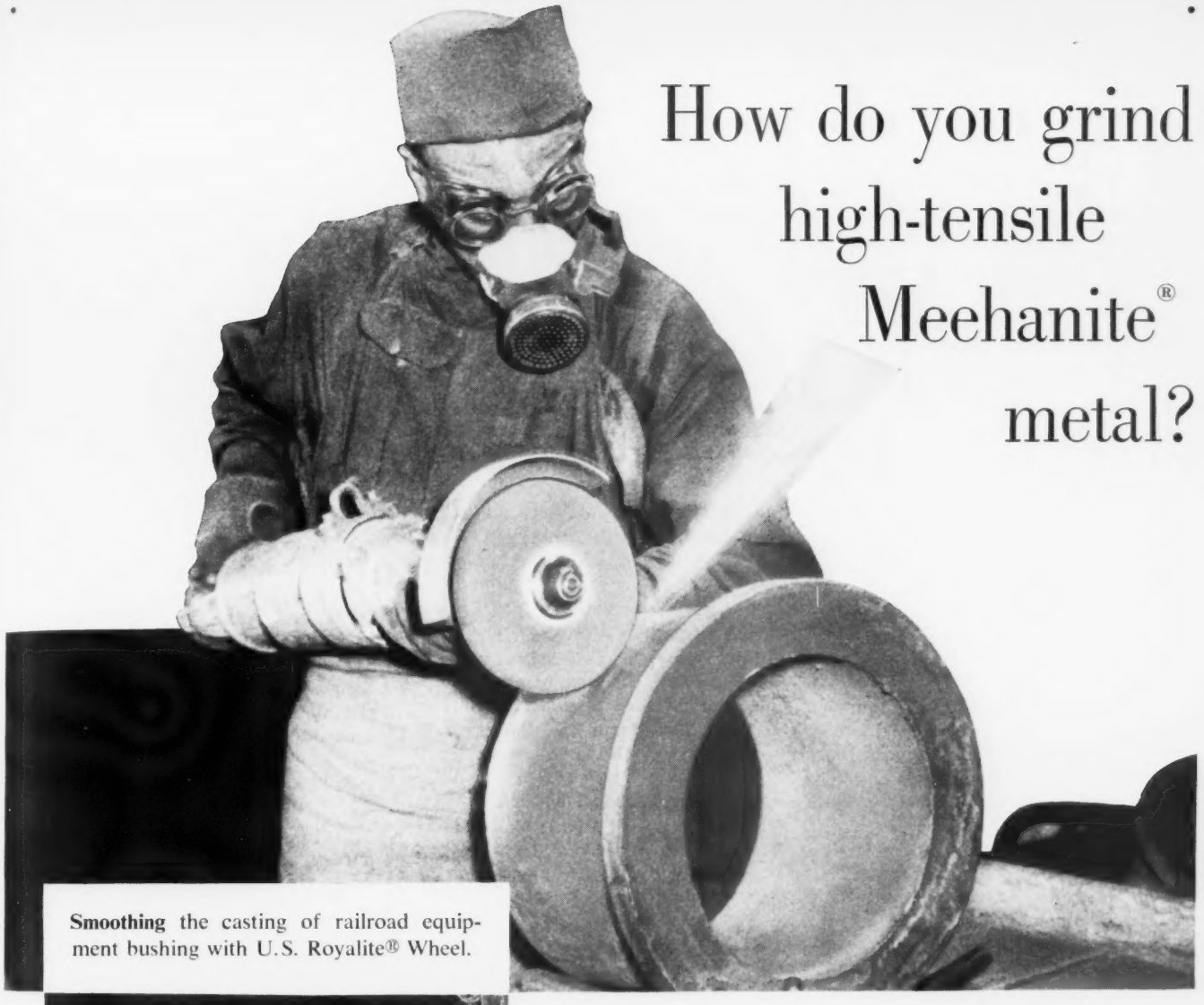
Speaking of driers, Mr. Blake stated that the goal of the designer should be rigidity and lightness. This can be achieved by making a drier that supports only the surfaces of the core that have to be supported and uses as little metal as possible to maintain rigidity.

Speaking in his usual interesting manner, William T. Bean Jr., Industrial Electronics Inc., Detroit, discussed "Good Casting Design on Purpose, or What Is Product Development?" John McBroom, Stainless Foundry & Engineering Co., Milwaukee, presided. Mr. Bean began by observing that if anyone engaged in castings production does not enjoy his job in the foundry, he should quit and get into something he does enjoy. Sometimes we are inhibited by our ancestors. Product development, according to Mr. Bean, is first of all a philosophy of merchandising. Secondly, it is a technical procedure by which the foundry can produce quality products. In others words it is technical know-how. Quoting from a recent FOUNDRY editorial, "Let's Sell Intelligently," Mr. Bean stressed the point that someone has to think in any product development program.

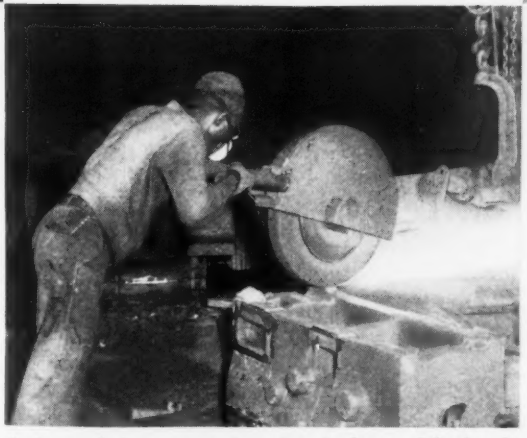
Any product development program must start with top management. The boss must evaluate his own ignorance before he can evaluate the ignorance of the customers. Engineers must know how to design castings. The foundryman should know enough of what is right and wrong to re-

(*Continued on page* 202)

# How do you grind high-tensile Meehanite® metal?



**Smoothing** the casting of railroad equipment bushing with U.S. Royalite® Wheel.



**Swing grinder** removing head from Meehanite metal casting.

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Officers of the Wisconsin Chapter of the AFS include, from left to right, Vice President Albert F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee; President Joseph G. Risney, Risney Foundry Equipment Co., Milwaukee, and Secretary Robert V. Osborne, Lakeside Malleable Castings Co., Racine, Wisconsin

(*Continued from page* 200)

fuse any attempt to undertake a casting that cannot be produced. Mr. Bean reported that it has been easier to teach some foundrymen to design good castings than it has been to teach engineers what foundrymen do in casting metals.

Investing in the future of the foundry industry can be accomplished with trained men, with adequately equipped facilities, with technical control and with knowledge of the properties required in the castings. Mr. Bean stated that recognized skill builds morale, that good facilities and high morale provide a good product, but that skill is of no value unless those with the skills have tools.

In a paper called "What the Fluidity Test Reveals about Gray Cast Iron," Lew F. Porter and Philip C. Rosenthal, instructor and professor of metallurgy, respectively, department of mining and metallurgy, University of Wisconsin, Madison, Wis., reported on research work. Presiding at the session was Frank Kulka, Motor Castings Co., West Allis, Wis. Producers of castings are not directly concerned with properties of liquid metals—their problem is to make solid castings of desired shape and quality. Nevertheless, to assure adequate feeding of the casting, fluidity and freezing characteristics of the liquid metal must be known.

Purpose of the paper, Prof. Rosenthal emphasized, was to show what has been learned about the behavior of gray iron from the fluidity test and how the test can serve as a foundry tool. The ordinary fluidity spiral showed deviations up to 10 per cent for metal of the same composition and same pouring temperature, or too much for usefulness in the program, and the test spiral was redesigned to cut the deviation down to about 2 per cent.

At one of the larger sessions of the conference, Richard Herold, Borden Co., New York, discussed "Shell Molding and Equipment" with Fred E. Katzenski, International Harvester Co., Waukesha, presiding. Mr. Herold stated that he considers shell molding a useful technique which will have a tremendous impact upon the foundry industry, but which should be looked upon as a useful supplementary tool which will not replace other methods. In addition, he prophesied that shell molding will have an important impact upon the forging and welding industries since some parts now are being produced by shell molding which formerly were manufactured by those methods of fabrication.

At this stage of shell molding's development, it is his belief, a foundry should use the process only when it has production runs and when the items involved require finish machining by present methods. Generally speaking, it is the elimination or great reduction of finish machining which will counterbalance the recognized higher material costs of the shell molding process. However, he predicted that time will provide simplified techniques and reductions in costs. Mr. Herold then discussed present production costs by the shell molding process.

In conclusion, he stated that while there are still many problems confronting shell molding, the same can be said of green sand molding. He believes that the process provides a technique which has a tremendous potential and will develop important new outlets for all branches of the castings industry.

### Film Shows Effect of Gating

The new A.F.S. colored motion picture, "Effect of Gating Design on Casting Quality," high-lighted the third nonferrous session. Chairman was L. Oertel, Racine Aluminum & Brass Foundry, Racine, Wis. Narrator of the film was Walter Bonsack, Christiansen Corp., Chicago, who had served as chairman of the A.F.S. Aluminum and Magnesium Division —now the Light Metals Division— and is vice chairman of that division's research committee, which directed preparation of this film and its two predecessors. The new film, like the two which have gone before, demonstrated that properly directed research can throw useful light on foundry procedures. For example, as result of the research, the foundryman now has a reliable and useful guide as to what is good and what is bad gating practice.

"Industry Looks at Apprenticeship Training" was the subject of a paper by R. G. Greiner, Industrial Relations Division, Allis-Chalmers Mfg. Co., Milwaukee. N. J. Anderes, Belle City Malleable Iron Co., Racine, presided. Mr. Greiner stressed the need of apprentice training in the foundry industry as an important phase of human relations and as an activity vital to the survival of our industrial economy. He stated that it was impor-

(*Continued on page* 204)

Seated at the registration table, from left to right: Treasurer L. J. Gratz, G & O Pattern Works, Milwaukee, and Seward E. Shaver, Archer-Daniels-Midland Co. All conference photographs by Walter V. Napp, Delta Oil Products Co

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(*Continued from page* 202)

tant for industry to have a reservoir of men to draw from in filling positions in management.

Men trained in the broad phases of the various operations in the manufacturing process are the one source for recruits for the first line of supervisors. This first-line supervisor must have the skills required to carry on work in his department. Quality can be improved and costs reduced through proper training. If the apprentice is taught to work carefully and to follow blueprints, he not only will avoid scrap but will aid in the manufacture of a better product.

"Material Handling in the Cleaning Room" was discussed by D. S. Bosma, Bucyrus-Erie Co., South Milwaukee, Wis., with R. Munson, Maynard Electric Steel Casting Co., Milwaukee, as chairman. The speaker described material handling in the cleaning room of his foundry and with aid of lantern slides went through a step sequence in both the light and heavy cleaning bays. He stressed the importance of reducing waiting time to a minimum by use of individual hoists and pillar cranes. Mr. Bosma pointed out that extensive use can be made of lift trucks and a combination of a transfer car and rubber-tired tractors. The Bucyrus-Erie cleaning room has been in operation approximately two years and is currently handling about 2000 tons per month.

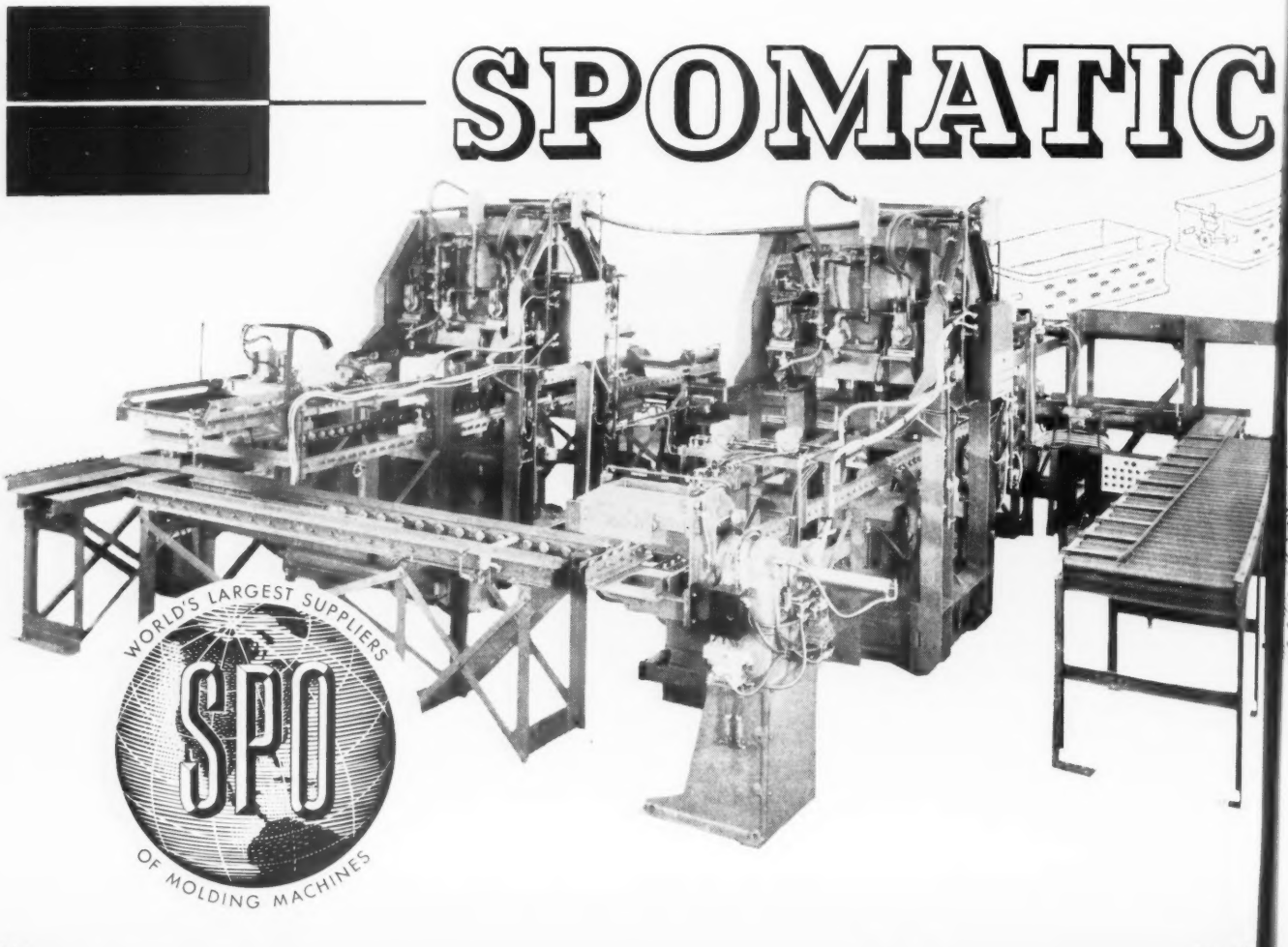
Tom E. Barlow, Eastern Clay Products Department, International Minerals & Chemical Corp., Chicago, spoke on "Casting Defects in Relation to Sand Practice." Leslie J. Woehlke, Grede Foundries Inc., Milwaukee, presided. Mr. Barlow discussed fundamental sand tests which may be performed in the laboratory with instruments or in the foundry by an experienced man who simply squeezes a handful of sand.

These tests indicate whether sand is wet or dry, weak or strong, brittle or tough, fine or coarse. Other laboratory tests indicate hot strength, permeability and flowability. The speaker outlined casting defects resulting from molding sands having characteristics either above or below optimum as indicated by the various tests described. In conclusion, Mr. Barlow emphasized that sand is only one item to which casting defects can be attributed. When causes of defects are being traced, all factors should be considered and the blame not placed arbitrarily on any one item. Placing the blame for defective castings on a pet peeve is an expensive practice.

"Principles of Control of Chemistry and Related Properties in Malleable Iron," was discussed by Prof. Richard W. Heine, University of Wisconsin, with R. N. Schaper, Wisconsin Appleton Co., Milwaukee, presiding. Mr. Heine's discussion indicated tnat the melting furnace gases can have a greater effect on the nucleation of graphite, nodule count and carbide stability than carbon percentage or temperature of iron during high temperature stages of melting.

Carbon monoxide melting furnace atmospheres promote nucleation of flaky graphite during annealing, as well as high nodule counts and resistance to graphitization of carbides in the first stage of annealing. Nitrogen and air furnace melting atmospheres cause more compact nodules to develop during annealing as well as lower nodular count and do not cause the resistance to graphitization noted as an effect of carbon monoxide. Nodule count does not indicate directly the degree of carbide stability during annealing. Time required for first stage graphitization is a better measure of carbide stability. The degree of carbide stability influences the time required for the first stage graphitization more than the graphite nucleating tendency on the range of analyses studied.

For its final session, the Nonfer-

rous Division conducted an "Information Forum." The panel of experts was comprised of George P. Halliwell, H. Kramer & Co., Chicago; George W. Anselman, Beloit Foundry Co., Beloit, Wis.; Walter Bonsack, Christiansen Corp., Chicago; and Carl Van Buren, Allis-Chalmers Mfg. Co., Milwaukee. Presiding as chairman was L. J. Andres, Lawran Foundry Co., Milwaukee. A good part of the discussion revolved around the question of how much oxygen is necessary in red brass to make a good casting. This proved a hard question to answer. It led into gating and risering and whether runners should be located in the drag or cope. The debate also veered into the matter of porosity of castings resulting from gas in the metal.

Speaking before the concluding pattern session on "New Developments in Pattern Practice," James N. Mathias, Accurate Match Plate Co., Chicago, covered coreboxes from master core plug patterns, white metal dryer patterns, aluminum dryer patterns and aluminum molds for plastic dryers. W. Stokes, Waukesha Foundry Co., Waukesha, Wis., was chairman of the session.

The speaker enumerated advantages that should appeal to the pattern engineer desiring to come up with corebox equipment via the core plug as follows: Since the same shrinkage is used for the core plug as for the master pattern, the same pattern layout can be used for both, thus conserving time and contributing to accuracy. Normally, less patternmaking time is required to make a core plug than to carve a core cavity. The core plug can be proved in a plaster mold of the master pattern, thus eliminating use of plaster cores from master core box cavities.

Other advantages are that the process can eliminate making of wood master dryer patterns or master dryer patterns carved and backed out from a plaster impression, as practiced in many pattern departments. One core plug usually suffices for multi-gang boxes. Since this method of making coreboxes and drier patterns involves use of plaster molds, the dimensional accuracy and smooth surfaces as cast inherent in this process can reduce substantially the machining normally required, or in many cases eliminate it.

At times, Mr. Mathias continued, the number of dryers required for a specified core would indicate use of an aluminum production plate, or at times the large size of the dryer pattern would indicate an aluminum dryer pattern rather than a white metal dryer pattern due to the weight factor. The additional shrinkage encountered may be offset by use of the newly developed expansion plasters.

Addressing the second day's luncheon, George K. Dreher, executive director, Foundry Educational Foundation, Cleveland, reported at some length on the first five years' operation of the foundation. Now 14 universities are participating in the program, offering 90 separate foundry courses, compared with 14 in 1947. As a consequence, the foundation program to attract more graduate engineers into the foundry industry is no longer a dream or an objective, but a definite reality.

Students in more than 77 engineering departments can elect study sequences leading to foundry careers. This compares with 16 such departments in 1947, he said. In 54 departments, some cast metals study is required.

"The foundry industry," Mr. Dreher emphasized, "has achieved a unique position in American industry as the first to develop successfully an engineering college program for the purpose of developing talent." He stated, however, that wider opportunities must be opened up for young men who have engineering intelligence but no means to go to college.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The new SPOMATIC molding machine makes the automatic foundry of the future possible today!

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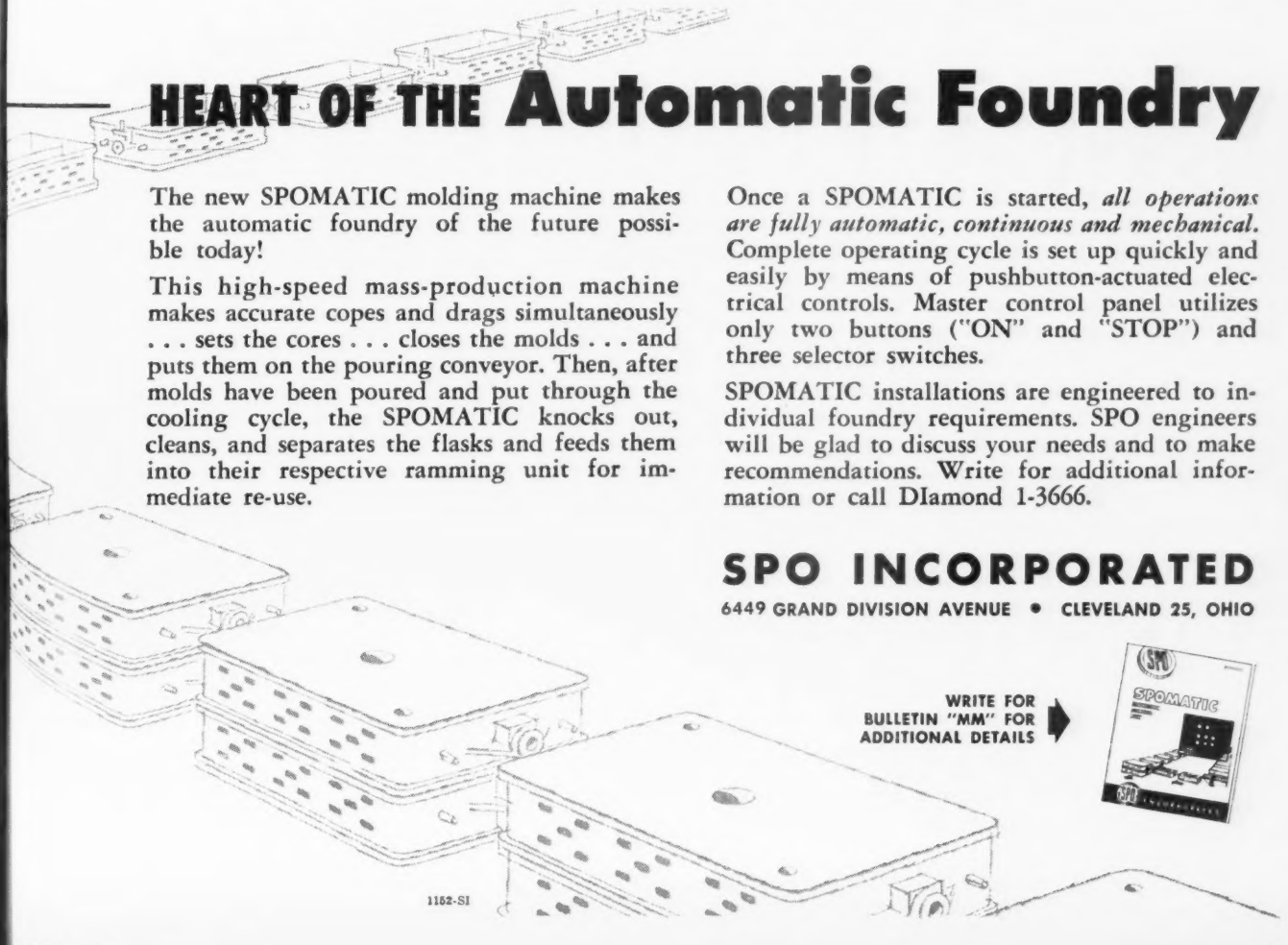


1152-SI

# Adventures of BILL

By PAT DWYER

Illustrations by RICHEY

EVERY once in a while, or to put it another way, every now and again, I treat myself to the pleasure of browsing through one of the early bound volumes of FOUNDRY. In these browsing expeditions I skip a great deal of the material, plant descriptions, news items, obits and puss-in-the-corner movements of foremen and superintendent. Most of my reading is confined to correspondence on controversial subjects.

Along about the turn of the century several champions presented long arguments in support of open risers. Other champions immediately donned the old battle armor and proved conclusively—at least to their own satisfaction—that all risers should be covered. In some instances discussion of this and other subjects was continued from month to month. Observing the strictest neutrality, the editor gave them all the space they wanted without comment. The net result, of course, in each case was a draw, with each writer firmly convinced that he was right and that his opponent should have a guardian appointed to look after him during his waking hours.

Nearly all these lusty warriors long since have laid down the pen, hung up the shovel and the hoe and silently vanished. Their bones are dust, their good swords rust and their souls are with the saints, we trust. Some of their descendants still are with us, ready and willing to carry on the feud any time and any place.

Another favorite browsing spot is the Krank's Korner. The author's name never appeared, but according to the best and most reliable grapevine sources, the candid and usually salty comment was credited to Henry Hansen, for several years associate editor of FOUNDRY. His pet aversion was clumsy and amateur newspaper and magazine presentations of technical subjects. In the *World's Work* for March, 1901 he spotted the following:

Making Steel

The most efficient steel mill in the world is that at Ensley, Alabama. There are larger ones in the North, but none which uses such remarkable modern methods in all the processes of production. Every step is automatic; from the time a miner picks up a lump of coal in the mines and places it in his barrow, it is not touched by *human hands* until it is ready to be packed and shipped as *finished product*. Meantime it has undergone all the various operations of the furnace and mill.

Dipping his pen into the editorial inkpot containing a mixture of gall and wormwood, vinegar, formaldehyde, sheep-dip and hydrochloric acid, the Krank joyously filled his Korner as follows:

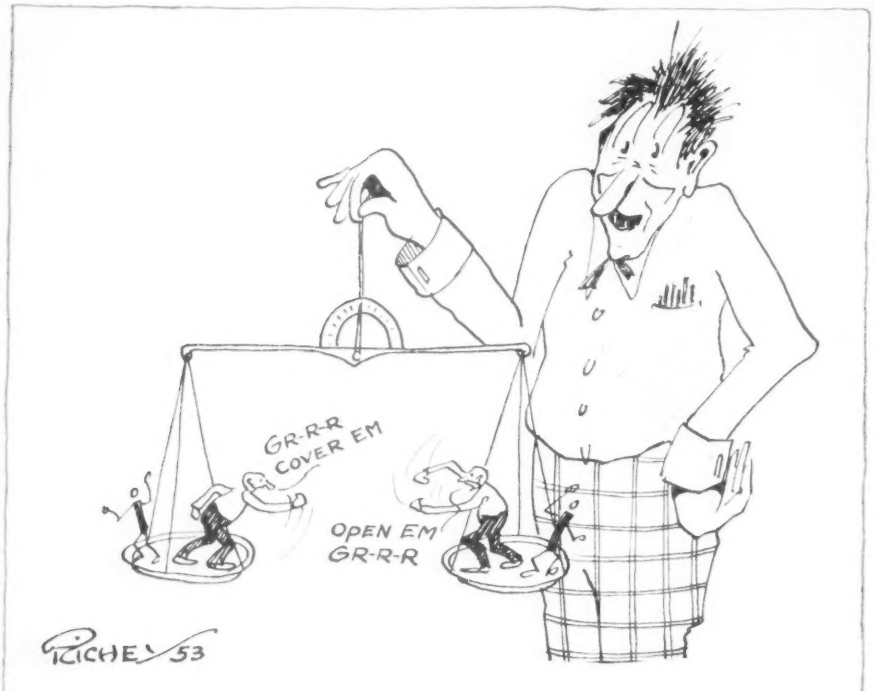
My, My! How the new and energetic South is outstripping and running rings around us. Covered with blushes, chagrin and embarrassment, here in the pokey North we are forced to admit that the coal to be converted into steel is picked up by the miner, carefully placed in his barrow and wheeled by him or a deputy out of the mine and into the steel mill, where it is broken or crushed with a sledge hammer. It used to be broken by human hands. The practice was stopped when the manicurist rebelled. "Ordinary hands," she said. "Yes, can do. Hands with skin like rhinoceros hide, no can do. I quit."

At this point the miner hands it over to the melter and the latter carefully packs the pieces of broken coal in a tin pan on the stove, where it is boiled for several hours, a blast of air being constantly and continuously blown on to it by the melter. In the more modern plants he uses a bellows, but in the old ones he blows through a long iron tube while stirring the coal with the other hand.

When the gases given off have a certain color, the melter adds a small amount of a composition of limestone, salt, etc., to physic off the carbon disulphide, hydrogen sulphide and other injurious ingredients. This treatment converts the raw material into semisteel, in which state it is taken from the stove and passed over to the molder who kneads it carefully on a molding board to work out all the organic matter. It is then washed with cast-steel soap, which is the final step that converts it into steel. It is then ready to be worked up by pounding and squeezing into the finished product, such as marine engines, ten penny nails, carpet tacks, etc.

To make the different qualities of steel, this product sometimes is melted up with the addition of other metals, and poured into holes made in the sand floor of the shop. These puddles of metal harden as they become cool and the product is known as puddled steel. The workmen are the well known steel puddlers. However, when it has been heated too much, small hollow projections appear on the surface. The result is known as blister steel. Where the

(*Continued on page* 210)




Well balanced arguments advanced by Tweedledum and Tweedledee

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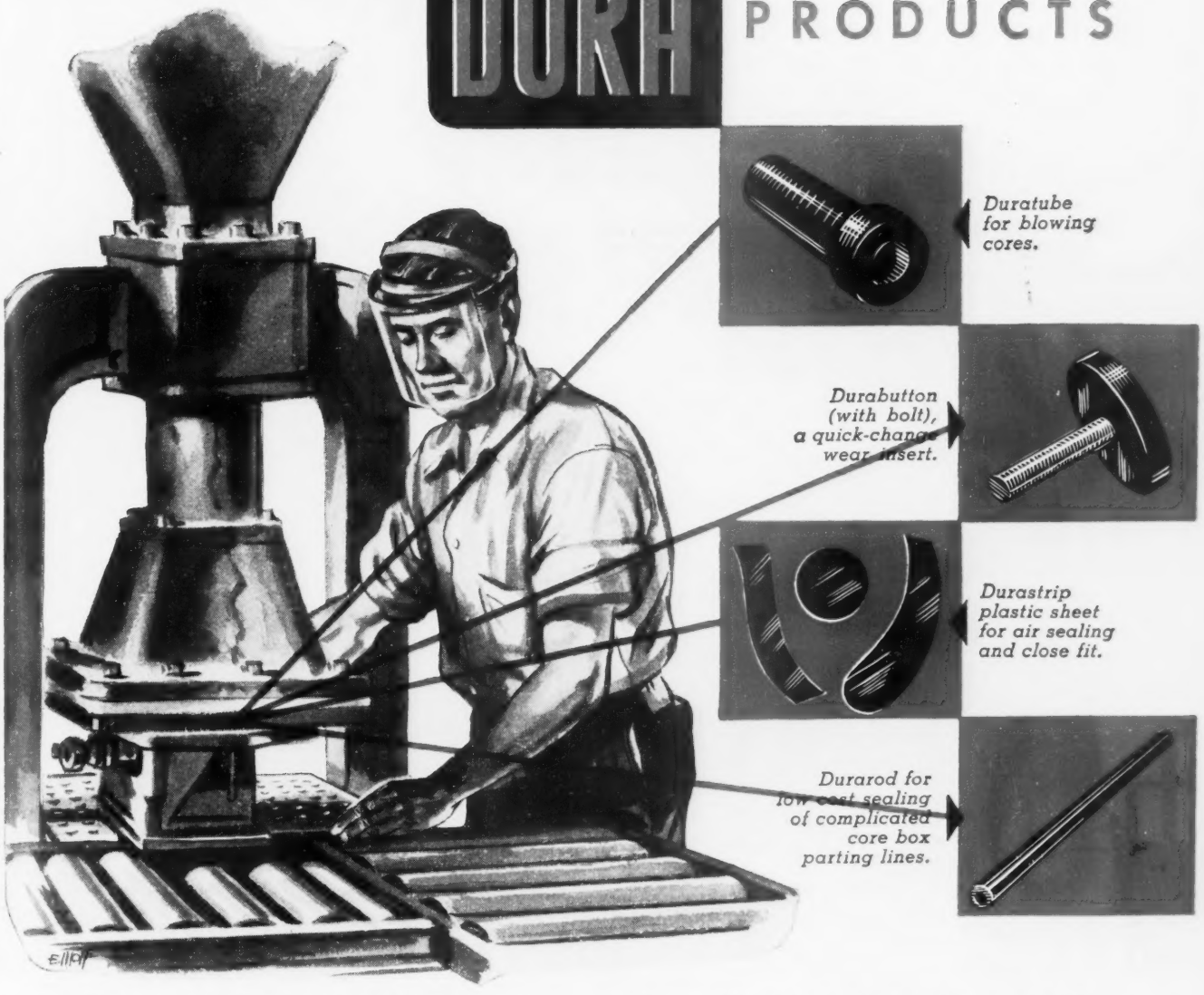
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*Duratubes* are of resilient plastic, easy to insert and remove by hand; they seal and protect blow holes. *Durabuttons* are furnished with or without a bolt. They cushion the blow of sand blasting below blow holes. *Durastrip* aids the fit between core box and blow plate, preventing wear and escape of air. *Durarod* provides a quick, convenient and economical seal for even complicated parting lines.

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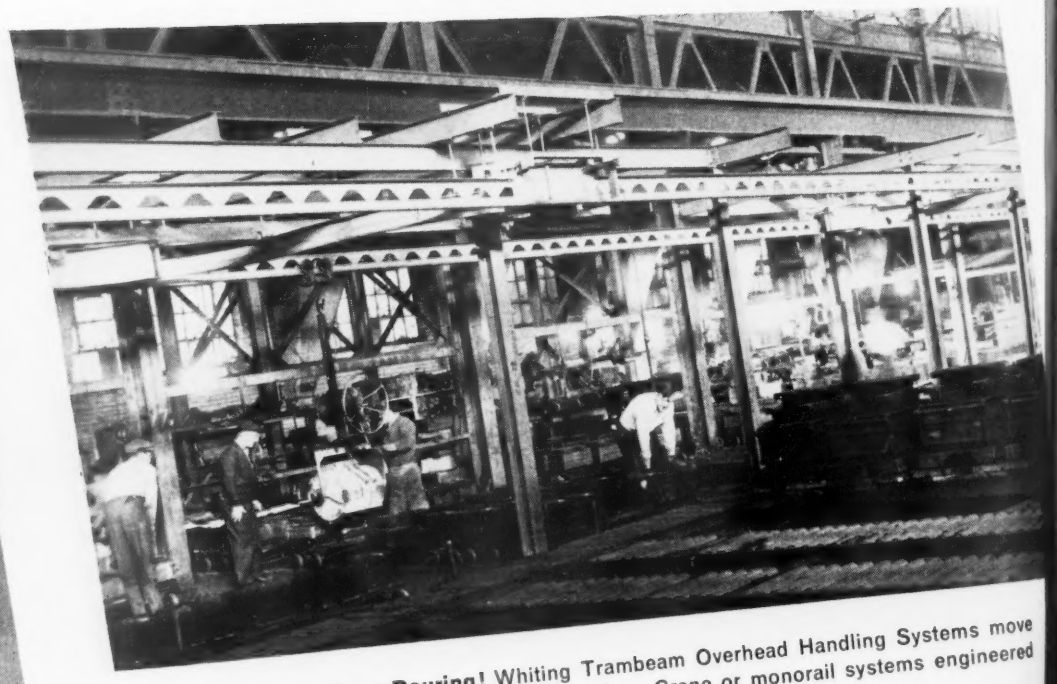

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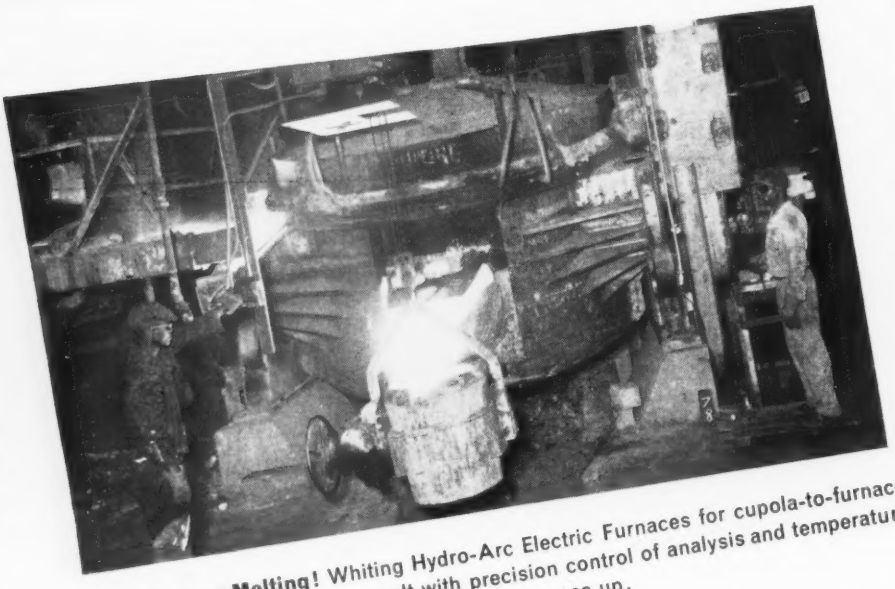

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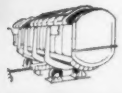
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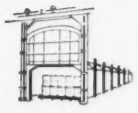
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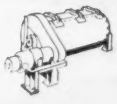
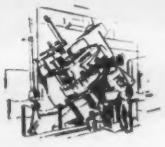
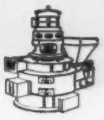

Tumblers


Electric Furnaces

Cupolas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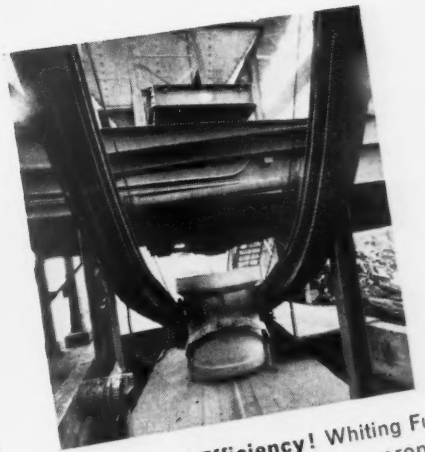

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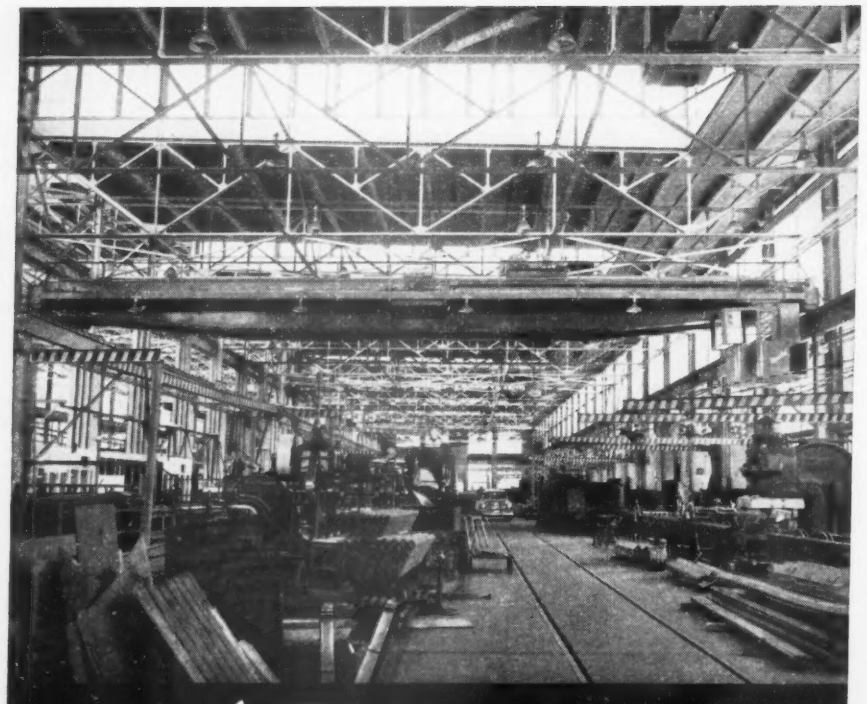

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**UNMATCHED ECONOMY** is incorporated in every "Shaw-Box" Crane. Let our engineers analyze your load-handling problem and recommend the best installation for dependable low-cost service. Write for Catalog 219 showing "Shaw-Box" Full Electric Traveling Cranes from 5 tons up; Catalog 218 for 'Load Lifter' Cranes from 1 to 20 tons; or Catalog 221 for Series "D" All-Electric 'Load Lifter' Cranes from 5 to 20 tons.

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(*Continued from page* 206)

floor sand is too *fat,* as they call it, pig iron is the result. Pig iron contains a right smart amount of steel, but it can be used for nothing but argicultural implements. We are greatly pleased to learn that all these laborious hand processes have been discarded at Ensley.

When I read this remarkable composition to Bill one night recently, he admitted it was a very nice piece of work, but like many other nice pieces of work it represented wasted effort. The man who wrote the original magazine article never would see it.

"However," he said, "association of ideas reminds me of some correspondence I had recently with a man who wrote that he had some big pieces of scrap lying in the yard for several years. Good men who had preceded him on the job carefully had ignored these big iron lumps. Canny lads. They did not believe in taking any chances. Other men to whom he had confided his ambition to melt the large pieces, strongly advised him to follow his predecessors' example. 'What do you think?' he wound up. 'Can it be done?' "

"Seems to me I have heard that subject debated more than once. What did you tell this honest pilgrim in search of the light on the disposition of heavy scrap?"

"Well, I'll tell you. I could have imitated one of these here now oracle fellas of the olden time and handed out the single word 'yes' as a complete answer to the question, 'Can it be done?' However, I decided to add a few words of what the legal lads refer to as pertinent and contributory evidence.

"Occasionally, for one reason or another, a foundryman is faced with the problem of melting a large piece or several large pieces of iron in his cupola. In the majority of instances doubt is expressed by one and all that the feat is within the range of practical accomplishment. The well wishers and random commentators claim that a cupola cannot melt a huge lump of iron. Really, there is no foundation for doubt or worry. If the object can be shoved into the cupola, it can be melted if a little care is observed. Examples have been noted several times in FOUNDRY and other technical publications.

"Probably the most spectacular description appeared first in *The Moulder's Text Book,* second edition, written by Thomas D. West in 1885. He referred to a 6000-lb rectangular iron block melted in a McKen-

(*Continued on page* 212)

# SPECIFICATIONS

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***...for all applications requiring dimensional stability, tensile strength, ductility, corrosion and shock resistance.***

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2506


(*Continued from page* 210)

type cupola, 40 x 50 in., in the Pratt & Whitney foundry, Hartford, Conn., not as an exhibition performance, but as part of a regular 11-ton heat.

"Many years ago, shortly after the turn of the century, James H. Anderson had some experience with melting heavy scrap in the cupola. Prompted by the admirable altruistic spirit which actuates all true foundrymen, and believing that description of the performance might be of interest to other foundrymen, James took his trusty pen in hand and—like Subadar Prag Tewarri in Kipling's *Grave of The Hundred Head*—told how the work was done. He did not mention the diameter of the cupola, but from the statement that he used 1-ton charges for a 27-ton heat, it is reasonably safe to assume the diameter was in the vicinity of 50 in.

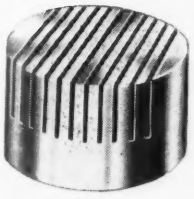
"At the time to which he refers, he was associated with a new foundry in Atlanta, Ga., which had been erected on the former site of an old grist mill that had been run by water power. The cast iron shaft that connected the overshot wheel and the gear in the mill was lying in the yard, and had been there for many months. It probably was the product of a cold blast charcoal blast furnace and was so large and tough that no method had been devised to get rid of it. This shaft was octagon in cross section, 8 in. from face to face on the large end and 5 in. across at the small end. Total length 22 ft. Approximate weight 2300 lb.

"The firm decided to replace a steel smokestack by a large one. A derrick was set up to remove the old stack and erect the new stack in its place. Noticing that the derrick boom swung over the foundry roof, James conceived the idea of using it to hoist the long cast iron shaft and lower it in through the open top of the cupola. 'Twas a kind of a glorified version of the sideshow sword-swallowing act.

"After putting in three 1-ton charges, the shaft was lowered into the cupola. The remaining charges were placed around it in the usual manner. The heat consisted of 27 tons, and our hero would not have been at all surprised to see at least one-third of the shaft come down in the drop. He was agreeably disappointed. The entire shaft melted. No difficulty was experienced in getting good hot iron for the regular product—woodworking machinery castings which required hot iron from the cupola spout.

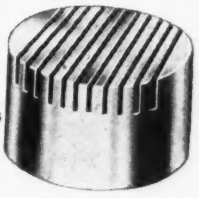
"Several years later Mr. Anderson accepted a position as foundry super-

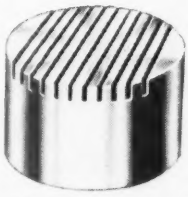
# SMILLIE
## CORE BOX VENTS
"A Specific Type for Every Core Box"
## Slotted



X-TRA DEEP HEAD
.156
Wide Slots
.014

DEEP HEAD
.093
Wide or Narrow Slots
.014 .010





SHALLOW HEAD
.031
Wide or Narrow Slots
.014 .010

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for
INSERTING CORE VENTS

- CORRECT DEPTH
- UNIFORMITY OF HOLES
- FASTER INSERTION OF VENT

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intendent with a firm in southwestern Ohio. In a preliminary survey of the quite extensive scrap yard he noticed several carloads of scrap car wheels. The wheels were too large to enter the cupola charging door, which was 18 in. wide and 24 in. high. No drop ball was available for breaking large pieces of scrap, so the wheels had been lying in the yard for a considerable time. The scene called to mind the long shaft melting episode in Atlanta. However, in this instance there was no derrick to lift the wheels and drop them in through the open top of the cupola. Anderson's thrifty mind balked at the wilful waste of so much good iron. Wheelmakers in those days insisted on using charcoal iron. Some time on the following Sunday while still mulling over the problem he conceived the idea of cutting a vertical slot above and below the charging door frame that would be wide enough to admit the wheels on edge.

"The cupola burden was made up of 1-ton charges, with a car wheel in each charge after the third. Castings poured from this iron ranged in weight from ¼ lb to 3 tons. Consequently, the iron had to be hot to prevent misruns in the light castings. These included parts for sugar mill machinery and a certain amount of general jobbing work. No more coke was used than for the usual run of charges. Several weeks later the charging door was enlarged to the height of the slot and to a width of 3 ft, making the size of the opening 3 x 4½ ft.

## Materials Handling Show Hits the Road

Traveling material handling clinics to discuss local handling problems with chapter members of the American Material Handling Society in principal cities will be conducted during 1953, according to a decision of the board of directors of the Material Handling Institute Inc.

Organized to promote better understanding of the correct application of material handling equipment, each traveling group will be headed by an MHI officer aided by qualified specialists in each type of material handling problem who have been selected from the membership of the institute. Clinics will be scheduled to meet requests from AMHS chapters. Members and other users of material handling equipment at the meetings will outline specific problems from the floor for analysis by the panel of specialists. The program will begin in the early spring and continue throughout the year.


# Core Hardness

Checked in Seconds!
with
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CORE HARDNESS TESTER

Why take chances with questionable cores? With this simple tester you obtain the true hardness value by measuring a definite depth of penetration of a spring-loaded abrading point. The hardness value is read direct on the graduated dial—no computation.

The Gordon-Campbell sand testing units offer the latest improvements for checking these critical properties of sand mixtures: clay content, permeability, bond strength, moisture, core hardness, and core strength. The tests are quick, and no calculations are required. They offer the simplest approach to sand control.

Write for full particulars on Gordon-Campbell sand control units. Savings in scrap losses will pay for these testing units.

*All Gordon-Campbell sand testing units are designed to conform with the recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society.*

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★ A typical illustration showing the application of Standard Radius Chills and patented Adjustable Radius Chills. Note how the Adjustable Radius Chills conform to the compound corner curves.

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Milwaukee straight section Radius Chills have been used to considerable advantage on straight fillets and edges in many leading steel foundries. The new patented Adjustable Radius Chills, with equally spaced slots so that sections may be cut off in one inch segments, fulfill the need where chills are necessary along the fillets of cylindrical, round, or irregularly shaped castings. These Adjustable Chills have effected substantial savings in welding and cleaning costs.

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## Chicago Foundry Group Honors Three Men

Three former officers and early members of the Chicago Foundrymen's Association were presented with testimonial plaques during a membership meeting of the association Feb. 19. They were Hermann F. Lehmpuhl, president, Sheffield Foundry Co.; William J. Michel, retired secretary and general manager of the Tarrant Foundry Co., which discontinued business in 1950; and Robert D. Phelps, president, Francis & Nygren Foundry Co.

The citations read in part: "In appreciation of many years of devoted and unselfish efforts toward the advancement of the foundry industry in all of its phases."

The Chicago Foundrymen's Association has been a service organization in the Greater Chicago area for better than 45 years, and the three men named have been additionally honored by receiving the first special service awards to be presented since founding of the organization.

## Book Review

*Productivity and Economic Progress*, by Frederick C. Mills, paper, 36 pages, 6 x 9 in., published by National Bureau of Economic Research Inc., 1819 Broadway, New York 23. Price 75 cents.

This work is one of a series of National Bureau studies dealing with production and productivity. The author reports that the major part of the margin of national output of the United States economy above maintenance needs during the last half-century was devoted to advancing consumption levels. He attributes this fact to increasing productivity. In the most recent decade, output per man-hour of labor input was nearly three times what it was 50 years ago, Dr. Mills reports.

"You can see why Joe's safety record is so good!"

## British Maintenance Team Reports on U.S. Tour

The British Productivity Council has published the report of the specialist team on plant maintenance which visited the United States last year under the auspices of the council and the sponsorship of the Economic Cooperation Administration (now the Mutual Security Agency). The 70-page report presents management and technicians with a comprehensive code of maintenance based on the best techniques employed in both the United Kingdom and the United States.

The ten-member team included senior engineers from a wide cross section of industry in the United Kingdom as well as management, technical and labor representatives. It made a 4000-mile tour through the eastern section of the United States, covering 16 plants: Aircraft, automobile, brewing, chemical, electronic, furniture, oil refining, paper making, textile and general engineering. Members also attended the third plant maintenance show and conference, at Philadelphia, January 14-16, 1952.

Copies may be had from the British Productivity Council, 21 Tothill Street, London S.W.1, for two shillings and sixpence each, or from the Office of Technical Services, Dept. of Commerce, Washington, D. C., to whom requests for information about the price should be directed.

## Book Review

*ASTM Standards* 1952, Part 1, Ferrous Metals, cloth, 1572 pages, 6 x 9 in., published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3.

This triennial publication just published by the American Society of Testing Materials contains all the standards and tentative specifications, methods of test and definitions relating to ferrous metals which have been formally adopted by that organization. It comprises 291 specifications divided into 18 categories. Of those 48 are of direct interest to foundrymen, and include 17 relating to steel castings, 17 to cast iron, 4 to malleable iron, and 10 on ferroalloys.

Printed on Bible paper to reduce bulk and weight, the specifications are arranged in double column format to provide easier reading. Three indexes aid in locating the desired information. One lists the specifications under the various material subdivisions, another lists them in numeric index while the third is a subject index.


# Savings Tips from HYDRO-BLAST

### *How to Knock Cores out of Castings And H—out of Costs*

Three good lessons from others' experience:

1. ***23,000-lb. casting,*** 15 x 8 x 3 feet, for upwright housing of a boring mill; average section 1½" —maximum 3".

   ***Before Hydro-Blast***—cleaning time for 1 man: 78 hours.

   ***With Hydro-Blast***—1 man with 30 gpm gun: 7 hours, 48 minutes.

Note: A 75-gallon Hydro-Blast would do the job in 2 hours!

2. ***170-lb. casting*** for riveter base —very complicated core.

   ***Before Hydro-Blast***—30-minute cleaning job for one man.

   ***With Hydro-Blast***—5 minutes for one man.

3. ***Casting for low-pressure cylinder*** of a reciprocating marine engine—***complex core:***

   ***Before Hydro-Blast***—two-hour job for one man.

   ***With Hydro-Blast***—15-minute job for one operator.

Similar "we done its", happening every day, in every type and size of foundry, present this crisp suggestion:

- Why don't you do likewise?

### *How About A Breath of Fresh Air!*

That the operation of a Hydro-Blast unit for cleaning castings also ***cleans the air*** in a foundry is generally known. But the astonishing ability of the Hydro-Blast to pull dust out of air a long distance away, is worth frequent reminder.

Two facts are important—established by scientific dust-count tests made with a foundry in full operation:

- dust concentration within 50 feet of a Hydro-Blast unit drops 50 per cent within half-an-hour after Hydro-Blast operation is begun.
- air outside Hydro-Blast, about 10 feet away at breathing level, immediately after Hydro-Blast operation, was freer from dust than good, clean outdoor air.

These facts set you thinking. If you are really anxious to reduce dust and to promote better working conditions, why not start by talking with Hydro-Blast engineers—no obligation, costs nothing, may likely pay off in a big way. Write us.

### *How Intensely Do You Dislike a 90% Waste?*

Most foundries buy and use just about one ton of new sand for each ton of finished castings. That sand is wasted—usually at big cost.

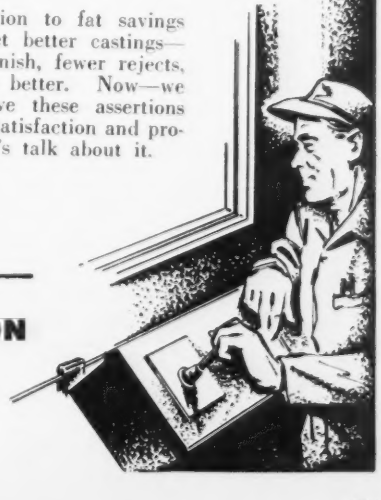
Too big! It is shipped in at the prevailing carload rate, and used—then hauled to the dump. In some instances somebody gets paid to haul it elsewhere.

What is your sand cost?

There's a way to save 90% of your cost of new sand and of the accompanying freight cost—use the Hydro-Blast method of sand reclamation:

- it gives you sand in every respect equal to parent sand—frequently better.
- it recovers as high as 95% of used sand—rarely less than 85%.
- it gives you that equivalent of good new sand at not to exceed $1.50 per ton.

In addition to fat savings you'll get better castings—better finish, fewer rejects, machine better. Now—we can prove these assertions to your satisfaction and profit. Let's talk about it.



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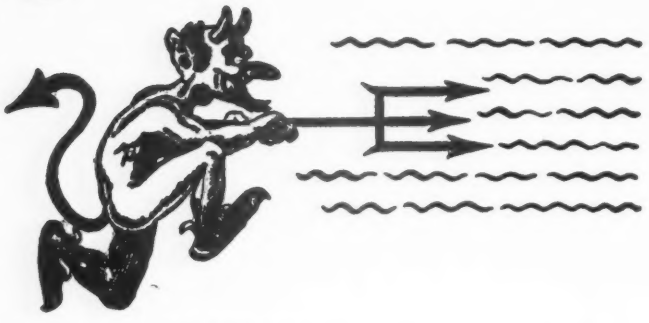

# FLUXES and EXOTHERMIC COMPOUNDS

## for all

## Metals and Alloys

THERMOTOMIC "X" COMPOUND is an exothermic material which is molded and baked into necked down riser cores and inserts. It produces a temperature of 3500° F. and is used as ring inserts under the risers or feeding heads. Great savings are realized through reduced riser dimensions and cleaning costs. For use on top of the metal in the heads we recommend Carbon Free Liquidizer No. 5.

THERMOTOMIC ABC—For aluminum and magnesium castings, necked down riser cores and inserts—prevents piping and shrinkage into castings. Soffel's ALX-31 Liquidizer should be used on top of the metals in the head.

THERMOTOMIC HoTop LIQUIDIZER — For short risers—save 60 to 70% of feeding metal in the heads.
SOFFEL'S EXOTHERMIC CARBON FREE LIQUIDIZER—Feeding head compound for castings and ingots of ferrous and non-ferrous metals—saves metal and prevents piping and shrinkage.
CARBON FREE LIQUIDIZER AL-X31—For aluminum and magnesium feeding heads—prevents piping.
EXOTHERMIC INSULATING SLEEVE CORE COMPOUND—For riser sleeves—adds heat and prolongs fluidity of feeding metal in heads or risers.
DENSILTITE LADLE FLUX—For iron and semi-steel—reduces sulfur and phosphorous. Adds fluidity and temperature in pouring ladles—produces clean iron.

### SOFFEL'S NON-FERROUS FLUXES

BB-2—For red brass, nickel and tin bronze pressure castings—removes sulfur, iron, phosphorous oxides and gas from brass and bronze.
SUPER BRASS FLUX—For brass and bronze—Prevents oxidation of zinc.
BRASS REFINING FLUX—For cupola melting and open flame furnaces—prevents oxidation. Produces liquid slag and faster melting.
COVERALL BRASS FLUX—Removes gas and oxides from yellow brass and nickel silver.
RADIOCLARITE BRASS FLUX—For open flame furnace melting—increases fluidity, tensile strength, removes gas, oxides and iron.
AB-6 BRASS FLUX—For electric furnace melting of brass and aluminum bronze—keeps furnace linings clean.
KLEEN-ALL BRASS CLEANER—Absorbs liquid slag and oxides from the metal—keeps ladles and furnace linings clean.
BRASS ALUMINUM REMOVER—Removes all traces of aluminum from copper, brass or bronze.
HI-LED BRONZE FLUX—Holds lead up to 50% in copper without use of nickel.
NICKEL MONEL FLUX—Removes gas and adds fluidity to metal.

ALUMINUM BRONZE FLUX—A perfect deoxidizer for reducing aluminum and iron oxide in manganese bronze and aluminum bronze. Adds fluidity.
COPPERTITE FLUX—For high conductivity castings—removes cuprous and cupric oxides and gas from copper.
FERRO-OUT IRON REMOVER—Removes free iron or alloyed iron from brass, bronze or copper.
SOFFELITE ALUMINUM FLUX—Removes aluminum oxide and iron from aluminum and increases the fluidity and tensile strength.
MAGNALUM FLUX—For magnesium and aluminum alloys — removes gas and oxide and increases fluidity.
KLEN ZINC FLUX — A deoxidizer and purifier for zinc base pressure die castings—removes gas, sulfur and iron.
DIE COATING—For pressure zinc base die castings—will not scale, blister or create gas in the molds.
PERMANENT MOLD COATING—For aluminum and magnesium castings — adds longer life to molds. Produces clean gas free castings.
POT COATING—For iron pot melting — increases life of pots. Prevents iron pick up.

U. S. Patents No. 2,490,327 and No. 2,500,097

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# PATTERNS—Their Relation To Castings Production

## Part VI

ABC of Foundry Practice

By T. H. TREVITHICK

SWEEPS are used to make molds other than loam molds and to strickle or sweep noncircular surfaces. A frame or templet, instead of the spindle and sweep arm, guides the sweep or strickle.

A segment or section of a circle can be struck in dry sand with a sweep centering on a spindle in the same manner outlined last month in the description of loam molding practice. The sweep describes an arc instead of a complete circle. The chord or length of the segment is determined by a templet or gage. When dry sand is the molding material, the interior and ends of the mold are formed with cores. The swept-up area is the outside of the mold. A mold of this kind usually is made in a pit. For example, consider a stator frame 20 ft in diameter and 6 ft deep that is molded and cast in four sections (Fig. 12).

A pit is prepared approximately the size of the required mold and large enough to contain the cores forming the poles and the inside walls, sides and ends of the casting. The spindle is set up in a space in the foundry floor about the required distance from the circumference of the mold. Its seat may be let down to a convenient depth in the floor if desired. The sweep is made as a frame with a brace extending diagonally from top to bottom and is fastened to the spindle arm. The striking or sweeping edge is set to the exact radius of the outside of the stator—in this instance, 10 ft.

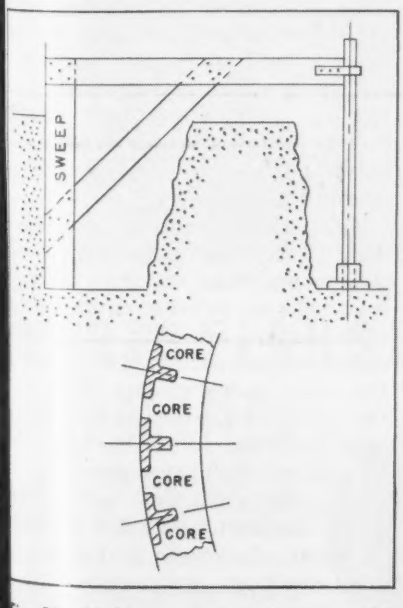



Fig. 12—Making a stator frame mold

The sweep is constructed so that only the necessary amount of sand is removed to make the mold. After the mold has been swept, dried and black washed, cores are set with the aid of templets or gages. These cores form the inside wall of the mold, the opening in the casting, the poles and the mold ends. The mold may be covered with a cope flask rammed full of sand or with a number of flat cores. Sand is rammed back of the inside cores to hold them in place. The outside wall of the mold may be brick and loam rather than sand.

When other than radial molds are to be swept up, a frame or form made to the outline of the required casting serves as a guide or bearing for the sweep. Rectangular castings sometimes are molded in this manner.

For example, a generator base casting (Fig. 13) made as a full or one-piece pattern would be expensive and difficult to handle and would occupy a great deal of space in the foundry and in the pattern storage building, especially in the larger sizes. Sweeps may be resorted to for this work. From the molding standpoint, the sweep method is just as economical as a full pattern, and of course there is no comparison in pattern cost.

With this molding method, a level bed is made on the foundry floor as explained previously. The frame is placed on the bed, the inside edges conforming to the outside shape and size of the proposed casting, and the first sweep forms the inside of the casting. The sand is dug out roughly, and then the sweep is traversed back and forth to impart the proper shape to the side walls and bottom of the channel. Sheets of paper or parting sand are spread over the surface, facing sand is spread over the bottom, and an arbor is lowered into place. A number of steel loops extend from the arbor to the top of the mold. Instead of attempting to sweep the corners of the base, the molder beds quarter-section pattern pieces in them.

The mold thus formed is rammed full of sand. A cope is placed in position, and stakes are driven in the floor at the corners or lugs. Hook bolts attached to the arbor loops extend upward a short distance above the cope bars. The cope is rammed full of sand and the nuts are tightened on the hook bolts. When the cope is lifted, the hanging body of sand comes with it. The cope is lowered onto suitable stands until the time to place it on the drag.

After removing the cope, the molder uses a sweep made to the outside shape of the channel section to scrape away a thickness of sand representing the thickness of the casting wall on both the sides and the bottom of the channel section. When this part of the mold has been finished, the cope is put back. Side projections, ears, bosses, etc., are located by templet and are bedded in the wall in the usual manner. Figures or raised letters are made in a shallow corebox. The core is bedded in the sand flush with the mold face.

The pattern equipment on a job of this kind consists only of a frame,

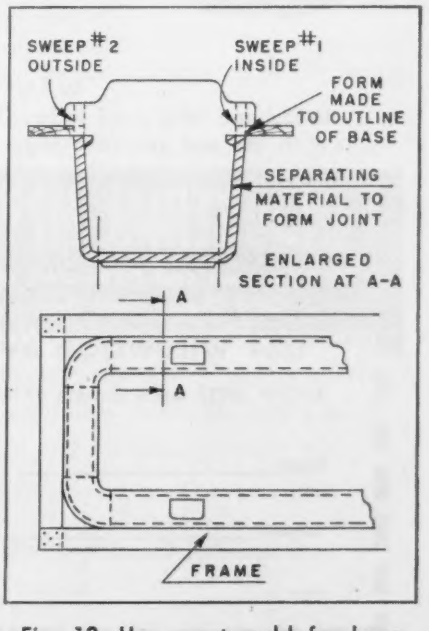



Fig. 13—Use swept mold for base

two sweeps and a few loose pieces.

**Shrinkage**—The terms "shrinkage" and "contraction" are applied to castings to refer to generally the same condition—that is, a drawing together or shortening—but they may convey to the foundryman a special significance, depending on accompanying conditions. Familiarity with this aspect of foundry practice is essential to designer, draftsman and patternmaker.

All pattern measurements are made by what is known as a contraction rule or scale. This rule makes an allowance for contraction in a casting. It differs from the ordinary or standard scale in that all the graduations are proportionately longer, according to the known contractions of various metals as they pass from the temperature of the molten state to that of the solid state.

The patternmaker's kit or tool box usually contains several scales, including, besides the standard, one for gray iron, one for malleable iron, and one for cast steel and brass. (In the pattern shop, all yellow metal is brass.) Due allowance is made for the various alloys, and special rules are available in the shop. Experience governs how a patternmaker makes various allowances, but the rules or scales mentioned are the only ones obtainable commercially and are owned and carried by the patternmaker as part of his regular equipment. Although these measuring scales are universally recognized as contraction rules, they can be relied upon only to measure unrestricted, or natural, contraction of metals. A considerable difference may exist at times between restricted and unrestricted contraction.

**Contraction Allowance**

| Metal | In. per Ft. |
|---|---|
| Gray iron | 1/10 to 1/8 |
| Malleable iron | 1/8 |
| Cast steel | 3/16 to 1/4 |
| Brass and bronze | 1/8 to 1/4 |
| Copper | 5/32 to 1/4 |
| Aluminum | 1/8 to 1/4 |
| Tin | 1/32 |
| Lead | 1/16 |

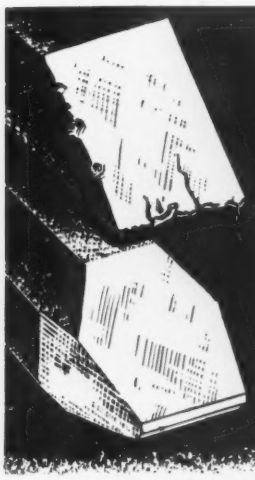
Unrestricted contraction takes effect in metals of uniform thickness where there is no interference. Normal contraction is restricted by the interference of mold or core parts, especially in comparatively thin castings in which the sections lie between hard cores. In some cases a sample casting is made and measured to determine the correct contraction allowance on the pattern.

The core in a cylindrical casting, for instance, may prevent normal contraction in the diameter although the unrestricted length contracts according to the contraction scale. Therefore, in constructing the pattern and the corebox, the patternmaker has to use one scale for the length and another scale for the diameter.

Some castings may vary to some extent depending on cooling conditions. If some parts cool too far in advance of others, they may affect the shape of the casting. When the castings from a perfectly straight pattern are warped or twisted, the pattern should be bent in the opposite direction.

Although the terms are used somewhat loosely, shrinkage and contraction do not mean the same thing. A solid cylinder or billet cast in a vertical position will show a depression on the upper end. This is caused by the outer part's cooling first, while the metal on the inside is still in a fluid condition. While the inner part is cooling, shrinkage draws in the outer crust (still soft) to a certain point, then no longer stays the atoms of metal adjacent to it, but lets go. The resulting cavity commonly

(*Concluded on page 220*)

# Half-Cracked Tools *Give You* Half-Cracked Results

How long would the fragile cracked chisel last on a job? Most grit fails quickly, too.

**HERE'S WHY!** All grit is made by crushing shot. How you crush it makes the difference. Ordinary methods twist and pull the material during crushing. Result—half-cracked grit loaded with worthless awkward shapes. In use, particles breakdown quickly and cannot do a first-rate cleaning job.

On the other hand, the Ball Mill method produces fracture-free grit. The solid chunky particles can take plenty of hard knocks. Why?—because the Ball Mill crushes with a direct solid impact—no pulling or twisting. Industrial uses the Ball Mill process *exclusively*. IMA Ball Mill Grit does a better job longer.

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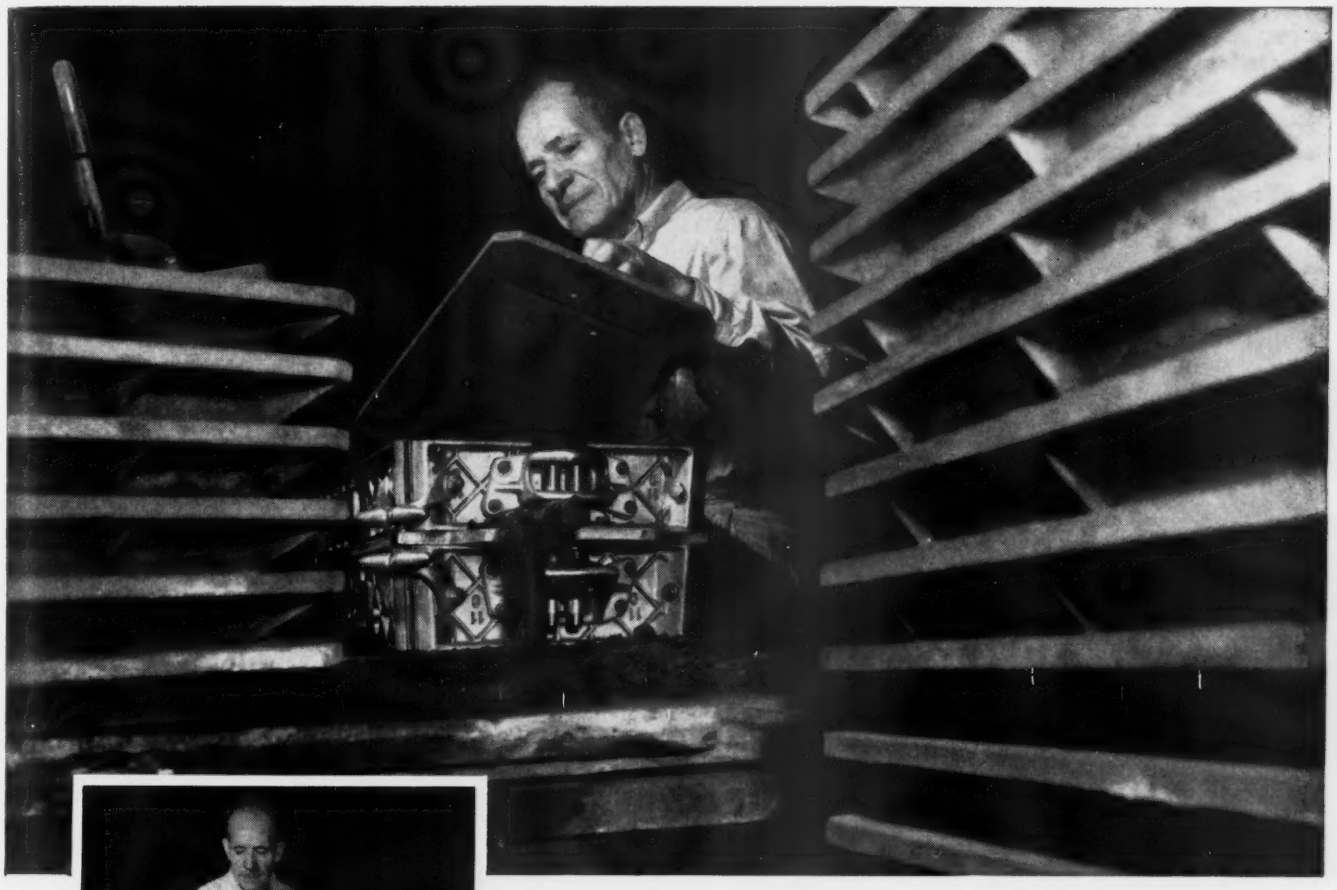
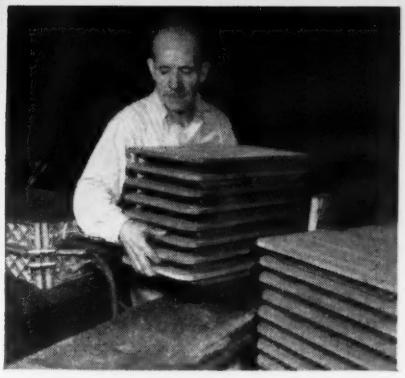
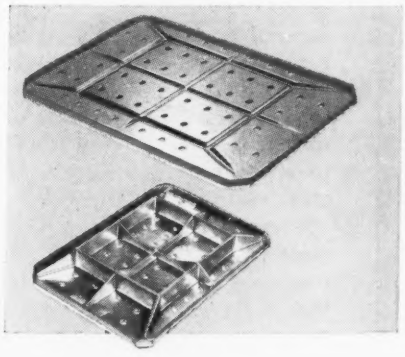




Molder finds EDCO Dowmetal Bottom Boards are light, easy to handle and stack.



# "We cut our board losses from 7500 down to 12 . . . by switching to EDCO Dowmetal Bottom Boards"

— *says R. D. BAYSINGER, Manager, Foundry Division*
GREENLEE BROS. & CO., ROCKFORD, ILLINOIS

Analysis of five-year records at the Foundry Division of Greenlee Bros. & Co. revealed a loss of only 12 Edco Dowmetal Bottom Boards, in contrast to a normal loss of 7500 wood boards during the same period of time.

"Further," says Baysinger, "we estimate *our scrap loss has been cut 20% since switching to Edco.*" Benefits like these are typical. For example, another Edco user commented, "Our old wood boards had a life of about two weeks; and toward the end of their life-span, they always produced some poor castings which had to be rejected." Edco Dowmetal Bottom Boards are different: they stand up under constant use . . . and keep casting quality up, too.

Add to this the fact they are light, easy to handle—stack in small space, easily and securely—and you'll see why it's "good business" to switch to Edco.

*Write us, or phone CApitol 7-2060 for price schedule and list of 78 standard sizes available from stock.*

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ALUMINUM ALLOY INGOTS
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(*Concluded from page* 218)

known as a shrink hole. The end of the casting takes on the appearance of an inverted cone with a hole at the apex, known as a pipe. To prevent this tendency toward piping, a shrink head is employed to supply the necessary extra metal. The pattern for the shrink head may be a separate unit, or it may be built on as an extension that is an integral part of the pattern.

If a design calls for a thin section to adjoin a thick section, a shrink hole will appear in the thick metal near the thin section as a result of the earlier cooling and shrinking of the light section, which pulls away from the fluid portion nearest the junction point. A casual examination may not reveal this form of shrink hole, but it is certain to be there unless the molder in anticipation applied a chill or shrink head.

A chill, as the name implies, is a substance placed either inside the mold cavity or in the sand forming the outside of the mold at the point where a shrink hole may appear, to cause the metal in the vicinity to cool more rapidly. The chill pieces usually are cast iron conforming to the shape of the pattern. Thickness and size vary with the thickness and area of the part to be chilled. Outside chills are placed against the pattern and rammed up with the sand forming the mold. When the casting is shaken out, the chills are recovered and cleaned for future use.

### Use Combination

In some instances a combination of chill and shrink head is required to prevent the formation of a shrink hole. In other instances the chill is sufficient in itself. The chill increases the hardness of the metal in the immediate vicinity, but eliminating shrink heads reduces the cost of cleaning the casting. There are exceptions, but the hardening effect generally makes it inadvisable to place chills on surfaces that have to be machined. Since annealing softens the metal, chills can be used to advantage on malleable iron and steel castings.

Because the thickest mass of a piece of metal shrinks last, a casting composed of exceptionally thick and thin sections may be broken by the forces within itself. It is especially necessary, therefore, that castings intended to support or resist pressure be designed to prevent this error.

It is true that much of the irregularity of flat castings and others may be remedied by proper attention to their cooling in the mold, but it is far more satisfactory in every way for the designer to regulate his design so that it will not be necessary for the foundryman to resort to special preventive measures.

(*To be continued*)

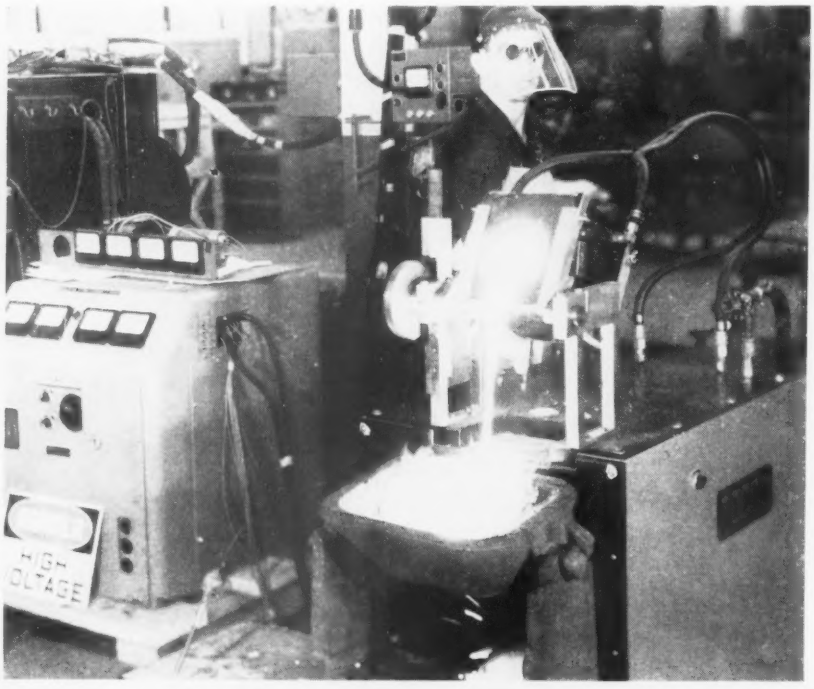
## TOCCO DIVISION OCCUPIES NEW PLANT

TOCCO Division of the Ohio Crankshaft Co., Cleveland, a short time ago moved into a new plant at 4620 East 71st St. This modern building, shown above, houses the division's facilities for manufacturing induction heating and melting equipment which formerly were located at the company's headquarters, 3800 Harvard Ave.

A two-story structure, the new 242 x 300-foot building has 100,000 square feet of floor area and incorporates general laboratories and testing areas as well as manufacturing departments. A substantial increase in productive capacity is provided by the new plant.

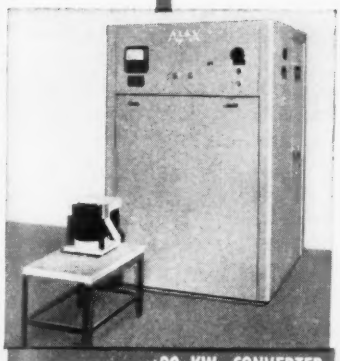
Tocco Division, founded in 1935, is an outgrowth of the company's search for better surface hardening equipment to use in its original business—the manufacture of precision crankshafts. The division's line of products subsequently has been expanded to accommodate not only hardening operations, but also brazing, soldering, annealing, shrink-fitting, melting, welding, and heating for forging or forming.

Among the various size induction melting furnaces manufactured are small tilting type units used to pour individual molds in precision casting foundries. One of these is shown below on the testing floor with a melted charge being emptied. In service the mold is clamped to the top of the furnace and the assembly is inverted for pouring.

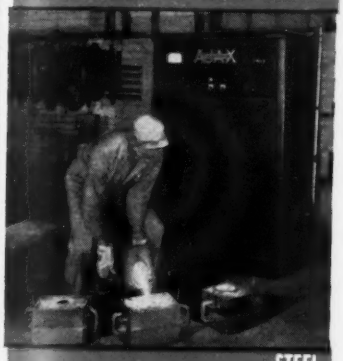


# *Starting Point For Better Melting*

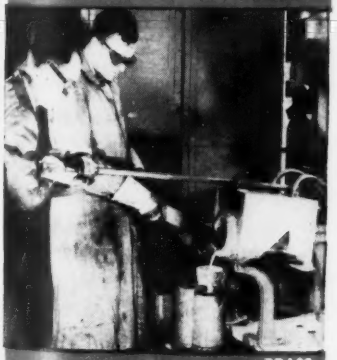
# AJAX-NORTHRUP CONVERTER-TYPE FURNACES



20 KW. CONVERTER



STEEL



BRASS

These compact, efficient furnaces are used in all leading metallurgical laboratories, and by the major producers of precision castings.

"Almost every new alloy since 1916 started in an Ajax-Northrup furnace."

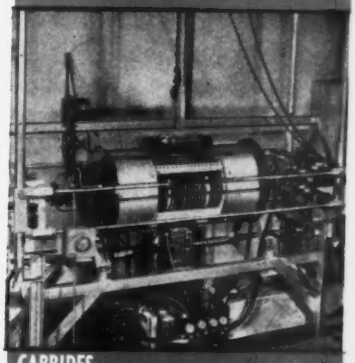
The 20 Kw. converter will melt 17 pounds of steel in 40 minutes. Maximum capacity is 30 pounds of steel, or 60 pounds of bronze. The larger 40 Kw. unit melts faster, will handle up to 50 pounds of steel. The 6 Kw. unit melts a pound of steel in 8 minutes.

All units may be used for heat-treating, forging, sintering or other applications—no problem to change from one to the other.

Ajax-Northrup converters are completely self-contained. They can be placed anywhere in your plant where water and power are available, require no special foundation or wiring — and they're certified to meet F.C.C. regulations.

Many of today's "blue chip" industries started with a 20 Kw. Ajax-Northrup converter.

RESEARCH



CARBIDES

GOLD

**AJAX ELECTROTHERMIC CORPORATION**
**Ajax Park, Trenton 5, New Jersey**

*Associated Companies*

AJAX ELECTROMETALLURGICAL CORPORATION
AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC.
AJAX ENGINEERING CORPORATION

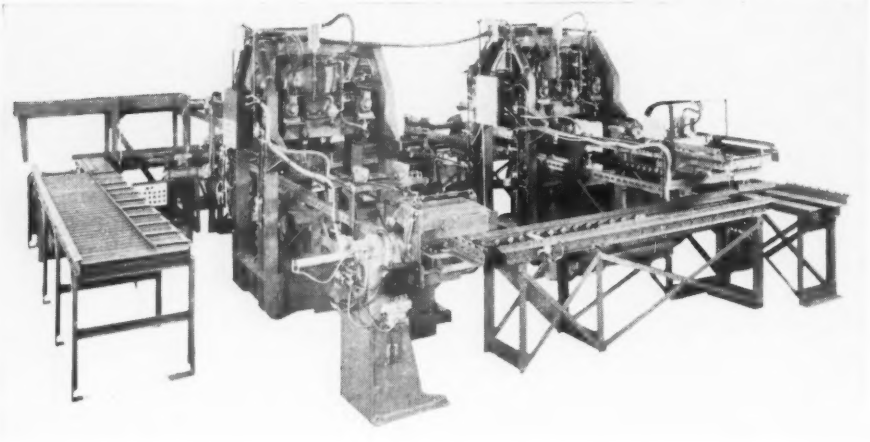
AJAX NORTHRUP

INDUCTION HEATING AND MELTING

*Since 1916*

# New EQUIPMENT and

## Automatic Molding Unit Operates Continuously



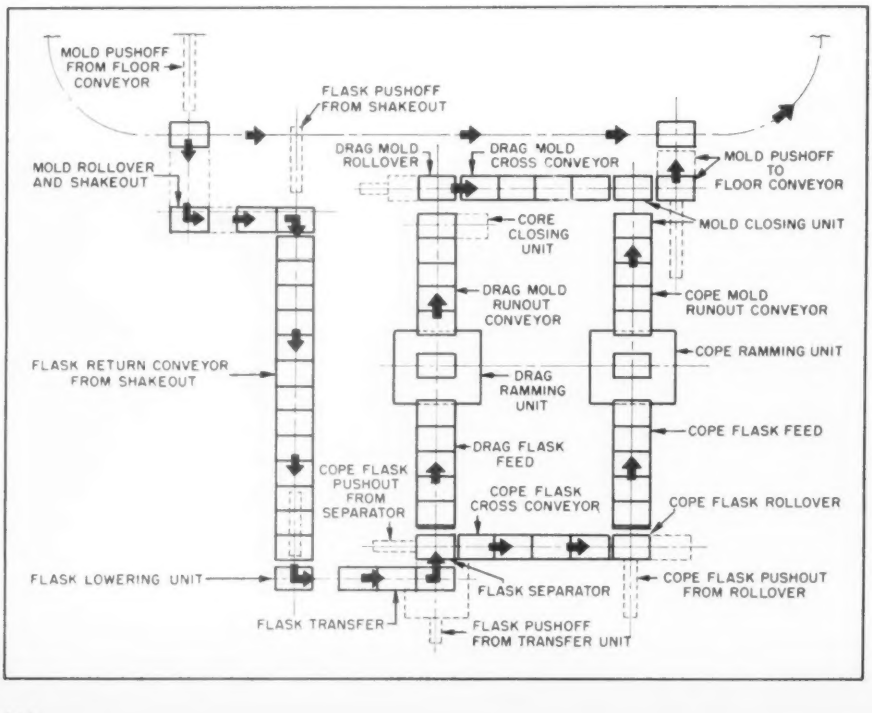
A HIGH degree of automatism is incorporated in a new high-speed molding unit developed by SPO Inc. 6449 Grand Division Ave., Cleveland 25. As shown in the view above, it includes separate cope and drag jolt-squeeze machines which produce the two mold halves simultaneously.

All operations including molding, core setting, mold closing and flask knockout—are automatic, mechanical and continuous. Manual attention is confined to placing cores in a frame which sets them mechanically in the drag. Operating cycle of the unit, known as the Spomatic, is set up quickly and easily; operation thereafter is continuous. The master control panel utilizes only "on" and "stop" buttons and three selector switches for automatic or manual operation.

Various steps in the unit's operation, and the flow of drag and cope flasks, are illustrated in the schematic layout below. Sand is fed to the flasks by an overhead metering box.

The equipment is designed to meet requirements of the individual foundry as to flask size. Units now in operation employ flasks 20 x 24 in. and 24 x 30 in. at a production rate of up to 300 molds per hour. No practical limit is set by the manufacturer on size of flasks the unit can be built to handle.

For More Details Circle No. 1—Page 225




**Gun Mix:** Cargan Products Co., 606 West Wisconsin Ave., Milwaukee 3—Gun mix for use in the air-placement process of cupola and ladle lining is said to produce a ceramic bond of maximum density. Basic ingredient is electric furnace massive quartzite ganister, with which are combined refractory and plastic bonding clays and selected inorganic compounds designed to promote fast particle fusion and uniform glazing action. Ganister fusion point is Cone 33—3173°F. Manufacturer reports that because there is little rebound with his product, a high percentage of particles adheres to the cupola wall.

For More Details Circle No. 2—Page 225

**Lubricant:** E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33—Lubricant for use at temperatures of 500° F and over is stated to provide high load carrying protection, but to be light enough to fog easily in automatic lubricators. Manufacturer says that combining molybdenum disulphide with a synthetic base and a pure, low-carbon-content petroleum oil imparts exceptional lubricity and high resistance to heat breakdown and reduces carbon buildup to a minimum on bearings exposed to elevated temperatures. Because the lubricant will not separate in storage, it is well suited for automatic spray.

For More Details Circle No. 3—Page 225

**Shell Molding:** General Electric Co., Pittsfield, Mass.—Company's chemical division offers synthetic materials for shell molding and traditional sand casting. New two-stage powdered phenolic resin which starts melting slowly when sand

# SUPPLIES

For More Details on These Items
Use Reply Card—Page 225

resin mix is dropped on pattern facilitates dense packing, particularly in deep draws, slots, holes and other intricate areas. Resultant dense shell molds are said to turn out castings with minimum burn-in and gas porosity, because of the reduced quantity of gas-producing catalyst in the resin. A water emulsion silicone parting agent for shell molding reportedly presents no fire hazard, leaves negligible residue on patterns and has good release properties that permit the use of small amounts of silicone. The company also makes a liquid phenolic core binder and a low viscosity pressure impregnating fluid.

For More Details Circle No. 4—Page 225

**Bin Boxes:** Convoy Inc., Canton, O.—Bin boxes made of chemically hardened, corrugated board save the cost of bin dividers and have a riser front to increase bin capacity. Entire box can be pulled out and weighed, thus facilitating inventories, since tare weight of the boxes is constant and number of stored parts can be computed easily from their weight. Rigidity, dimensions and handling ease of the boxes permit cross stacking for quick transfer by pallet.

For More Details Circle No. 5—Page 225

**Potentiometer Indicator:** Foxboro Co., Foxboro, Mass.—Portable potentiometer indicator spots impending thermocouple failures, tests operation of other pyrometer instruments and checks such equipment as heating units and test furnaces if they do not require continuous measurement. It also can replace any installed potentiometer temporarily out of service. The metal case includes a removable cover over the operating knobs and dials. Dimensions are 6¼ x 9¼ x 9¼ in., and weight is 14 lb, with battery. Accurate to ¼ of 1 per cent, the instrument can be operated in either a vertical or a horizontal position. An extra-long, 17-in. scale permits close, accurate reading. Single or double scale models will operate with test couples or with existing couple installations.

For More Details Circle No. 6—Page 225

**Casting Repair Plugs:** U. S. Plug & Fitting Co., Wellington, O.—Casting repair plugs in three styles—solid, long and knockoff—range from 1/16 to ½ in. in size and come with

## Die Casting Machine Uses High Pressures

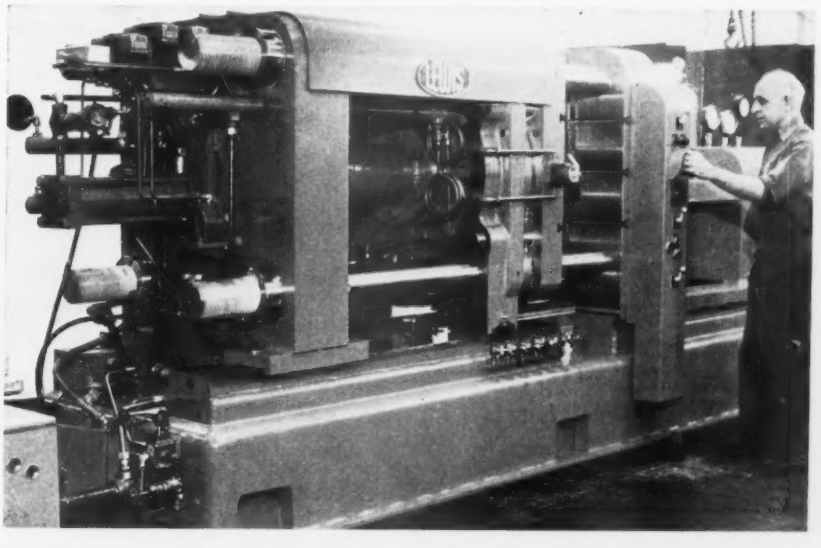
DIE forge casting machine employs a principle of injection which provides for rapid mold filling and for high final squeezing pressure. These factors are said to prevent shrinkage voids during freezing of metal and excessive porosity caused by air and gases trapped in the dies.

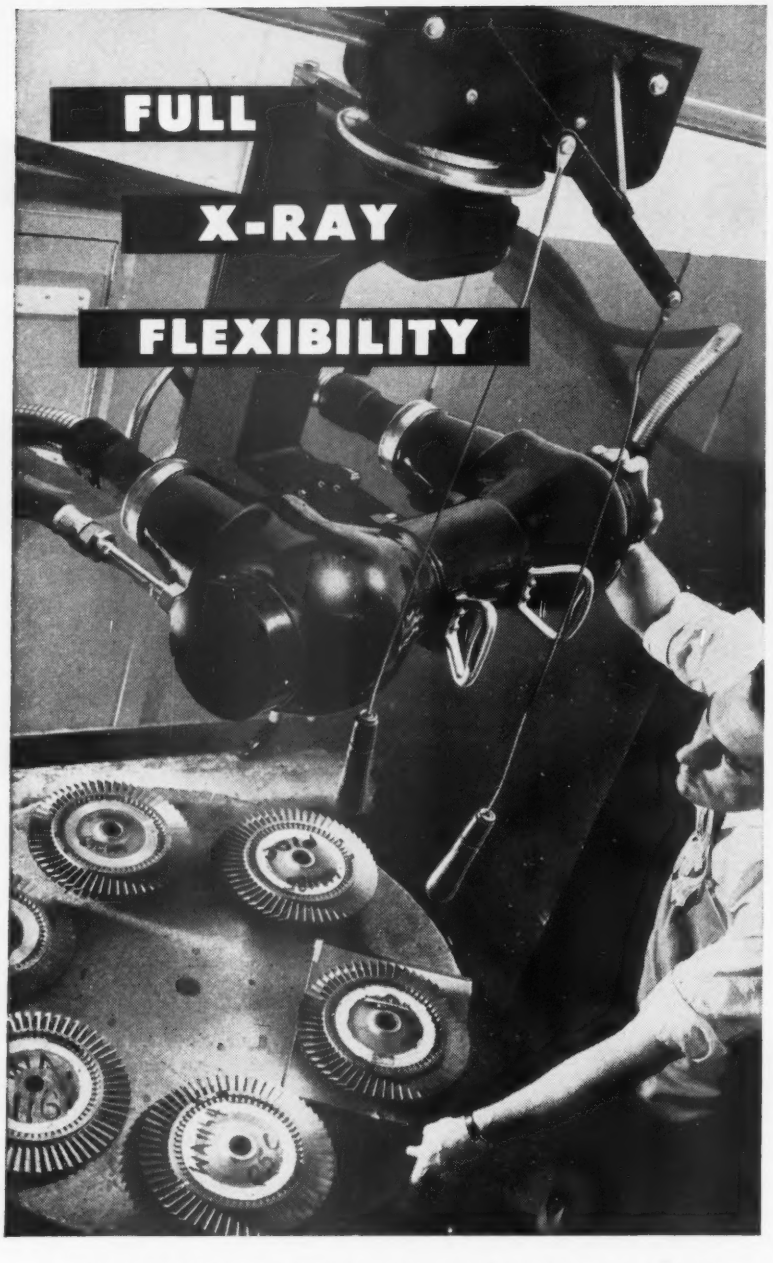
The machine also features a method of clamping the dies together that develops a final clamping pressure of 650 tons, necessary to resist the 100,000-lb pressure developed during injection with 2100 psi in the hydraulic system. The 100,000-lb pressure is the maximum and can readily be adjusted to varying casting requirements.

Clamping mechanism of the machine embodies three principal elements. A small hydraulic cylinder advances the platen, on which the moving half of the die is mounted, until the die faces are open only a fraction of an inch. A mechanical locking device holds the platen in the closed position. Incorporated in the platen structure is a 28-in.-diam hydraulic cylinder, actuated automatically through the control circuits, that does the final closing of the dies and supplies the final locking pressure.

Because of the shortness of this cylinder's stroke, only a fraction of a gallon of oil and a few tenths of a second of time are required for this part of the clamping cycle. The complete casting cycle requires 4 gal of oil. The hydraulic unit is furnished separately so that it can be mounted at the user's convenience. Weight of the die casting machine is 29,000 lb. The machine is manufactured by Lewis Welding & Engineering Co., Bedford, O.

For More Details Circle No. 7—Page 225






WESTINGHOUSE 250 KV JIB CRANE X-RAY UNIT

Curtiss-Wright uses Westinghouse X-ray equipment for nondestructive testing of vital parts of their outstanding aircraft engines. Here, they're examining critical welds on gas turbine booster rotors. Prime reason for selection of Westinghouse equipment was *flexibility*—since *flexibility* results in more radiographs per shift.

Kilovoltage on this unit varies from 30 to 250, with greater X-ray output per KV because of constant potential high voltage generator. Result: unit is capable of inspecting materials ranging from 1/8" aluminum to 4" steel.

Jib crane tubestand and X-ray tubehead flexibility allows maximum ease of positioning in radiographing parts of all sizes and shapes. Result: time is saved, output is stepped up.

Call in the Westinghouse X-ray representative, or write Westinghouse Electric Corporation, Industrial X-ray Section, 2519 Wilkens Avenue, Baltimore, Maryland. J-08265

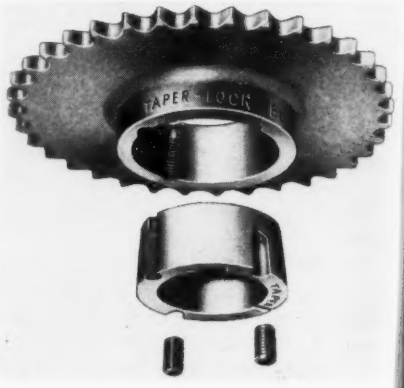
YOU CAN BE SURE...IF IT'S

Westinghouse

either standard tapered pipe thread or 27 threads, as desired. Used to repair such casting defects as sand holes and blow holes, they assertedly insure a tight, leakproof, metal-to-metal, dry seal between the plugs and the parent casting. Drills, reamers and taps required for all operations are also available from the manufacturer. Casting is drilled for size of plug to be used, and hole is reamed with a standard pipe reamer with a taper of ¾ in. per foot., then tapped. The plug is screwed into the hole and drawn up tight, and the head portion is ground or finished off as desired.

For More Details Circle No. 8—Page 225

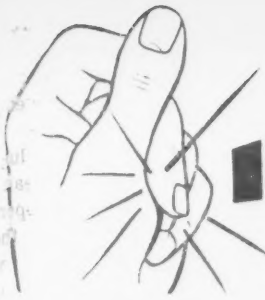
**Sprockets:** Dodge Mfg. Corp., Mishawaka, Ind.—Roller chain drive sprockets are keyed to the shaft with what manufacturer says is the firmness of a shrunk-on fit. When a sprocket is to be replaced, it comes off easily and quickly, and the bushing can be reused. Availability of the sprockets and bushings in a range of sizes for most industrial applications avoids the need for reboring of sprockets to fit shafts. Compactness of the sprockets, which occupy no more space than standard types and have no flanges or protruding parts, contributes to safety. A complete range of B-type steel sprockets, 40 to 100 pitch, will be available. The range in the 50-pitch sprocket, for example, is 11 to 112 teeth. All bushings and small sprockets will be packaged individually. Chain will be packaged in 10-ft lengths and in 50 and 100-ft reels.




For More Details Circle No. 9—Page 225

**Resin:** Plastics Division, Monsanto Chemical Co., Springfield, Mass.—Resin is said to eliminate clay balls from foundry sand and make possible production of true, clean, economical castings. Manufacturer reports improvements in sand workability, flowability and packability. Resultant uniform packing assertedly avoids most of the cracks, fissures

(*Continued on page* 227)



# IDEAS FOR FOUNDRYMEN

**AVAILABLE FOR THE ASKING—This reader-service is designed to provide foundrymen with "idea" and reference material. Listings are selected from company product literature and reprints of special FOUNDRY editorial articles.**

### 55. Drag Conveyors

A. B. Farquhar Co., Conveyor Div.—Need more drag in your coal handling problems? Then get a load of the 400 series of drag conveyors pictured, described and specified in 8-page bulletin DC-3-51. Average ultimate strength per strand of drag chain is 14,000 lb. Speed is up to 100 fpm.

### 56. Oxygen-Nitrogen Generators

Air Products Inc.—Data in 12-page catalog 52 is not just a lot of hot air but serves to describe high-purity and tonnage oxygen-nitrogen generators, illustrates their typical installation and operation, and tabulates performance. Units can produce 99.5 per cent pure oxygen and/or nitrogen compressed up to 2650 psi.

### 57. Molding Machines

Pioneer Mfg. Co.—"Fast, simple, economical, easy to run"—that's how 4-page bulletin describes Rapid molding machines. Six models and a molding bench are illustrated and briefly described. Specs, features and prices are added. Send for it now.

### 58. Electro-Polisher

Buehler Ltd.—High quality metallurgical samples are produced speedily with the Buehler-Waisman electro-polisher which is described in 4-page illustrated bulletin. In addition to showing results of etch and polish on various materials, theory and practice of electrolytic polishing are discussed.

### 59. Melting Furnaces

Stroman Furnace & Engineering Co.—"Stroman Metal Melting Furnaces of Lasting Perfection" is title of 20-page bulletin 800. Units which exemplify the Stroman line, such as stationary dip out and tilting furnaces for melting ferrous and nonferrous metals, skip hoists, smelters, furnaces, and core ovens are covered. Oil burners, ladle heaters, oil pumps and centrifugal blowers are also described.

### 60. Vibration Tester

Got the shakes? In your equipment, that is. If so, the model 652 Vibratron will analyze the cause of vibration, locate and correct unbalance, and evaluate vibration in equipment and products. Full details of this portable testing equipment are available in 4-page illustrated bulletin 652 published by the International Research & Development Corp.

### 61. Bulk Freight Car Unloaders

M. F. I., Inc.—Descriptive material, photographs and specifications for Rajon gondola and box car unloaders can be found in this literature. Bucket type machines, both different, really do a job that ordinarily is difficult, expensive and time consuming. These devices will "get a load off your mind."

### 62. Adjustable Ramps

Rowe Methods Inc.—If you don't know about Adjust-A-Docks or Adjust-A-Trucks, both adjustable ramps for loading docks, this 4-page illustrated brochure will tell you all about them. Engineering details, operation and types of units available are detailed. Even installation details are given for the electric-hydraulic units.

### 63. Pouring Ladles

C. H. Milles Foundry Co.— For the measurements of a little ladle with a cast iron constitution, who will keep her shape even when things get pretty hot, get data sheet on pouring ladles. Two types are specified.

## Additional Information?

For additional information on any of the items described under "New Equipment and Supplies," "Trade Publications" or "Helpful Literature" in this issue—simply circle corresponding item numbers on one of these cards

4-53

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## 64. Handling in the Foundry

Baker-Raulang Co.—Selected case studies designed to help the foundry industry cut handling costs are contained in multi-paged file-size folder. Included are 8-page illustrated article "Materials Handling in the Foundry" and five illustrated case histories. Equipment used, services performed, summary of benefits and detailed data are included.

## 65. Heat Treating Furnaces

Johnston Mfg. Co—Line of gas or oil burning foundry furnaces for heat treating, annealing, carburizing, brass melting, stress relieving and forging are covered in 48-page bound catalog. Pressure blowers, gas or oil burners as well as line of heating torches are specified as well. Drawings, photos and full specs are given.

## 66. Steel Treating Facilities

Pearson Industrial Steel Treating Co.—Want to treat your parts right? Then send for 6-page folder which describes and illustrates company's facilities for commercial heat treating, carburizing, hardening, normalizing, annealing, tempering and stress relieving.

## 67. Foundry Ceramics

American Lava Corp. — AlSiMag bulletin 532 deals with foundry ceramics that withstand heat shock. Covered are such products as strainer cores, gate tubes, cut-off cores and troughs.

## 68. Industrial Construction

Commercial Contracting Corp.—24-page company brochure is descriptive of company's operation and methods in constructing, installing and equipping industrial, institutional or commercial projects. Booklet illustrates the building operation from start to finish and lists 22 of over 3000 completed projects. Teamwork is the keynote expressed throughout the book.

## 69. Let Air Do It

There's a Bellows air-powered manually-controlled nonrotating air motor and control for practically any job requiring pushing, pulling, clamping, feeding, lifting, squeezing or holding. If you want information on these versatile air-actuated devices, Bellows Co. will be glad to send you 36-page illustrated manual BM which gives specifications and dimensional data.

## 70. Welding Accessories

A. O. Smith Corp., Welding Products Div.—If any of your operations involve welding, you'll profit by getting and reading a copy of bulletin W-146 entitled "A. O. Smith Welding Accessories." Described are electrode holders, ground clamps, cable connectors and splicers, hemlets, eyeshields, headgear, goggles and lenses, cleaning tools, brushes, protective clothing, gloves, ovens and other accessories.

## 71. Chaplets & Chills

Milwaukee Chaplet & Mfg. Co.—Beside showing you some of the facilities for this company's line of chaplets and chills, 16-page illustrated brochure No. 51 outlines features which insure their fusing in any casting. Various standard and special types are shown and described and info on ordering special chaplets is given. Also covered are Milwaukee mold anchors.

---

IMPORTANT READING FOR FOUNDRYMEN

We have a limited quantity of the following reprints which we can furnish while they last.

## 72. Shell Molding

You get the inside story of how International Harvester Co. has developed its shell molding program, from the development and research work and specification of equipment to actual plant layouts, in this FOUNDRY reprint. Written by the general supervisor of foundry research, it is x-tremely interesting reading. Better get it!

## 73. Apprentice Program

Your friend and mine, Pat Dwyer, our engineering editor, tells you how Fulton Foundry & Machine Co. has set up its foundry apprentice program. If you get this FOUNDRY reprint you'll read about it and see some of the forms used.

*Sort of a month-end clearance is what you could call this offering of* FOUNDRY *reprints. Only a few copies of these are available, but the quality is the same as always. They're offered on a first come-first get basis. When they are gone, that's all folks.*

74. "Handling Materials in the Cleaning Department"

75. "Sand Reclamation at the Eddystone Plant"

76. "Things We Know and Don't Know About Cast Steel"

77. "Some Recent Developments in Centrifugal Casting"

78. "Effect of Oxygen Content on Iron Casting Properties"

79. "The Accountant Reports to Management"

80. "Some Experiences in Producing Ductile Iron"


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(*Continued from page* 224)

and soft spots common in untreated sands. One pound of the resin is claimed to produce uniform clay distribution in one ton of foundry sand, and only 1/16th burns out each time the sand is used.

For More Details Circle No. 10—Page 225

**Batch Ovens:** Blue M Electric Co., 306-08 West 69th St., Chicago 21—Industrial type batch ovens feature automatic wattage control that permits the reduction of wattage in relation to temperature and load. A

power selector switch is built into the wiring circuit for wattage control, power cost savings and efficient temperature stabilization. Heated air is circulated from both sides, horizontally and vertically. Positive fresh air intake and positive exhaust are standard equipment. Applications include preheating, core baking, tempering and other uses. Three standard models, of 16, 24 and 32 cu ft capacities, have working chambers 24 in. deep and 48 in. high. Widths, respectively, are 24, 36 and 48 in. All operate on 230-v, 60-cycle, alternating current, single or three phase. Any of the models can be supplied for 440 v. All wiring is enclosed and complete.

For More Details Circle No. 11—Page 225

**Conveyor Lubricator:** Alemite Division, Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago 14—Lubricator delivers a preset, constant shot of oil or other lubricant to each trolley wheel on each side of the conveyor system in which it has been installed. When every wheel in the system has been serviced, the system can be switched off, then switched on again as needed. The entire unit is contained on a section of I-beam 37¾ or 40 in. long, fitted into the conveyor track at any convenient

(*Continued on page* 229)


an ACCO product

AMERICAN CHAIN

"Why do we use American Chain?"

"For two reasons," said this manufacturer of heavy machinery. "First, we have used American Chain successfully for years. Second, the high strength alloy it is made from permits using smaller diameter chain which is hooked up easily by our men. And the men like the way the grab hooks slip over the links and set themselves securely. I think they just feel safer working with American Chain."

This AMERICAN CHAIN user is referring to our 125 Endweldur alloy steel, heat-treated ACCO Registered sling chain with our series 40 drop-forged grab hooks.

No matter what chains you require, AMERICAN has them and will furnish chains that will last longer . . . and cost less to use. Call your AMERICAN CHAIN distributor today and let him make recommendations. Or write to our York office for Bulletin **DH-314**.

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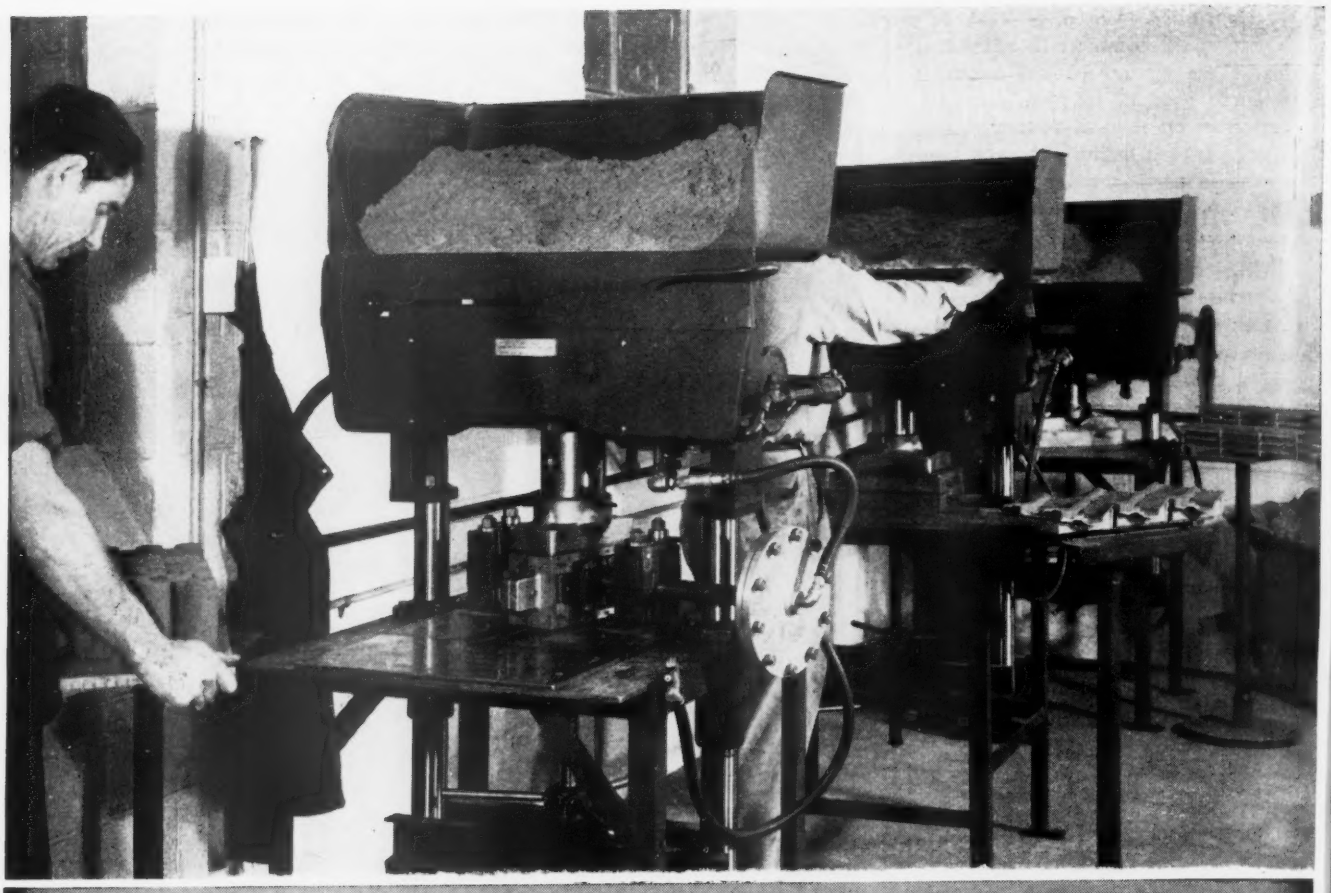
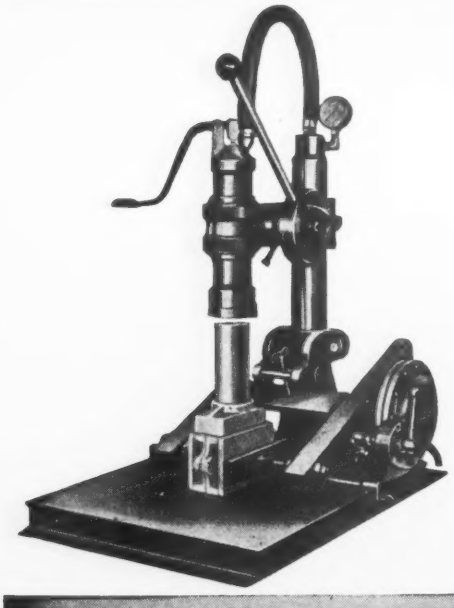


# REDFORD *No. 2 Stationary Magazine Type* CORE BLOWER



NEW features and functional design permit maximum production with a minimum of effort . . . Accepted in hundreds of foundries as the most efficient machine for the production of cores up to 5 lbs.

*Write for Specification Bulletin "F".*

## Redford Cartridge Type Bench Core Blower

- **The original small core blower.**
- **Proven simplicity—Speed and Flexibility.**
- **Makes cores up to 2 lbs.**
- **Thousands in use.**
- **Write for Bulletin "G".**

**REDFORD**
**IRON & EQUIPMENT CO.**
**20733 Glendale Detroit 23, Mich.**
**Phone KEnwood 1-8611**

(*Continued from page* 227)

spot in its length so long as the location is within reach of the house air line and a 115-v, 60-cycle electrical outlet. Headroom of 22 in. is required over the top of the I-beam. As each wheel reaches the spot on the track where the lubricator is installed, a coupler clamps the lubricant fitting on its hub, delivers the required amount of lubricant, instantly disengages and is ready for the next wheel.

For More Details Circle No. 12—Page 225

**Flexible Conduit:** American Brass Co., Waterbury 20, Conn. — Underwriters' Laboratories-approved for use in wet locations, liquid-tight

flexible metal conduit is made of spirally wound, interlocked, zinc-plated steel strip with a copper bonding conductor wound spirally in the space between each convolution on the inside of the conduit. Extruded synthetic covering over the flexible metal core reportedly protects wiring against moisture, oil, dirt, chemicals and corrosive fumes. The conduit can be cut to required lengths, and Underwriters' approved fittings for use with it are available.

For More Details Circle No. 13—Page 225

**Emergency Light:** General Scientific Equipment Co., 2700 West Huntingdon St., Philadelphia 32—Emergency lighting unit turns on automatically and supplies sealed beams of 100 cp for 10 hours. Power comes from built-in storage battery that is automatically charged by a trickle charger. A built-in hydrometer indicates the state of the battery at a glance. The unit plugs into any alternating current circuit.

For More Details Circle No. 14—Page 225

**Platform Scale:** Detecto Scales Inc., 540 Park Ave., Brooklyn 5, N. Y.—Overhead suspension scale is designed for use where it is impossible to install a dormant platform scale which requires a pit for the lever system. If it is not possible to recess the platform of the overhead unit, ramps can be supplied that will permit loads to be moved on and off, and the scale can be furnished with or without an angle support stand. Swivel head mechanism is moisture-proof and completely sealed. The scale is available with a dial attachment or a unit weight cabinet attachment. The gross weighing capacity of the cabinet attachment can be increased through the addition of up to four drop weight increments, each equal to 100 per cent of the dial capacity. Additional use of the capacity beam increases total potential gross platform load by another 100 per cent of the dial chart capacity. Gross capacities are 100 to 4500 lb with the dial attachment and 1125 to 6500 lb with the unit weight cabinet attachment.

For More Details Circle No. 15—Page 225

**Safety Goggles:** Pennsylvania Optical Co., 234 South Eight St., Reading, Pa.—Plastic frame of spectacle type safety goggle is designed to retain safety lens even when subjected to severe impact. Features include easily adjustable, cable-wound ends on wire core temples; large, flaring nose pads, and a choice of flat, 1.25 or 6.00 curve lenses. In addition to its general industrial use, the goggle is especially suitable for use in chemical and electrical plants.

For More Details Circle No. 16—Page 225

**Furnace Shutoff:** North American Mfg. Co., 4455 East 71st St., Cleveland 5 — Tight shutoff feature said to eliminate the need for expensive solenoid valves for hot furnaces requiring on-off operation is being offered as optional equipment on the firm's controls for proportioning oil and air flow. The controls regulate flow by maintaining proportional pressures in the oil and air lines. They have a built-in ratio that gives an outlet oil pressure 12 times greater than the air pressure. Several burners in one control zone

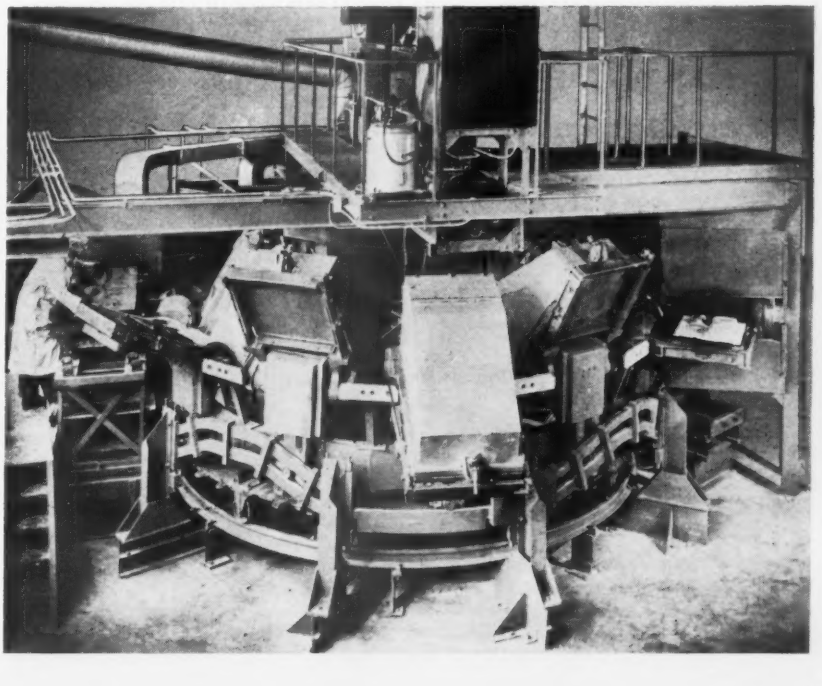
## Machine Makes 500 Shell Molds per Hour

AUTOMATIC, 12-station shell molding machine is operated by one man and makes approximately 500 shell molds per hour. Pattern size on the standard model is 22 x 28 in. Cycle begins as pattern carriage moves up and engages the sand-resin hopper. Clamped tightly together, pattern and hopper swing forward to below the horizontal, the material falls on the pattern, and the shell mold is formed.

Pattern and hopper rise, hopper is disengaged, and pattern carriage, bearing the soft shell mold, returns to horizontal and enters the oven, which is heated with gas-fired radiant burners. Mold is cured fully when it emerges. The mold release pins lift automatically, the mold is removed, and the molding cycle begins all over again.

An automatic proportioning system at the top of the machine mixes sand, resin and wetting agent and deposits the mixture in the hoppers in controlled quantities at each revolution of the machine. Pattern plates can be changed quickly without stopping the machine, and as many as 12 different patterns can produce molds simultaneously. The machine is manufactured by Mechanical Handling Systems Inc., 4611 Nancy Ave., Detroit 12.

For More details Circle No. 17—Page 225



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**KRANE KAR**

SWING-BOOM MOBILE CRANE

**CAN SWING IT!**

1½, 2½, 5 and 10 ton cap.

By swinging the boom over the side of gondola cars *"KRANE KAR can unload 50 to 55 tons of pig iron and malleable steel in 3 hours,"* reports a Midwestern foundry. Speeds Unloading into storage piles and bins . . . Loading of scale cars and charging buckets . . . and Handling of big castings through grinding and finishing operations.

***KRANE KAR*** Lifts, Transports, and Spots loads of any shape or size up to 10 tons. Using hook or magnet, ***KRANE KAR*** safely and efficiently handles Patterns, Flasks, Molds, Cores, Sand Boxes, Rails, Ingots, Billets, Slabs, Scrap . . . and, with a bucket, Coke, Sand, Clay, Coal. Rubber-tired, gas-powered ***KRANE KAR*** works indoors/outdoors 24 hours a day!

Thousands of ***KRANE KARs*** serving Foundry, Iron and Steel Industry throughout the country. *Write for Bull. #89, "How to Cut Handling Costs."*

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**When You Think of *Aluminum Ingot***

**THINK of S-G**

The sign, S-G, on aluminum ingot means aluminum of uniform quality made to meet the most rigid chemical and physical specifications. Whether it's for permanent mold, sand or die cast you can be sure with S-G ingot.

Our complete modern research and testing laboratories are available to help you secure just the right ingot to meet your needs.

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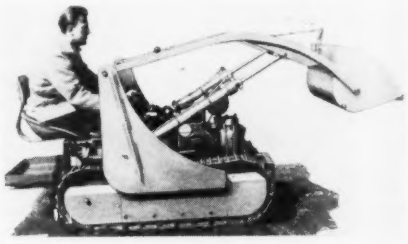
Riverview at 2nd Street • Kansas City 18, Kansas


can be serviced by one control. Controls come in two sizes, rated at 25 and 90 gph. Both require an oil inlet pressure of 25-30 psi.

For More Details Circle No. 18—Page 225

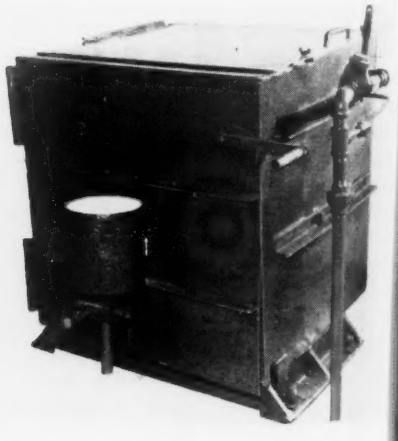
**Crawler Tractor:** Mead Specialties Co., 4114 North Knox Ave., Chicago 41—Crawler tractor with high-lift bucket has a two-speed transmission, final drive that runs in oil,



fully shielded bogey carriage and spring loaded front idler wheels. Bucket lifts from below ground level to 6 ft high. Tractor is 40½ in. wide, 95 in. long and 39½ in. high with bucket level with tracks. The 1-cylinder, 4-cycle, 6-hp, air-cooled engine has two forward speeds and one reverse. Bucket capacity is 5 cu ft. Foundry applications include sand handling and cleaning excess materials around flasks, and it has many yard applications and other uses.

For More Details Circle No. 19—Page 225

**Centrifugal Casting:** Centrifugal Casting Machine Co., Tulsa, Okla.—Water-cooled centrifugal casting machine, made in six different sizes, covers casting range from 1 in. ID to 16 in. OD and up to 60 in. long. It uses inexpensive permanent molds made of ordinary steel tubing.

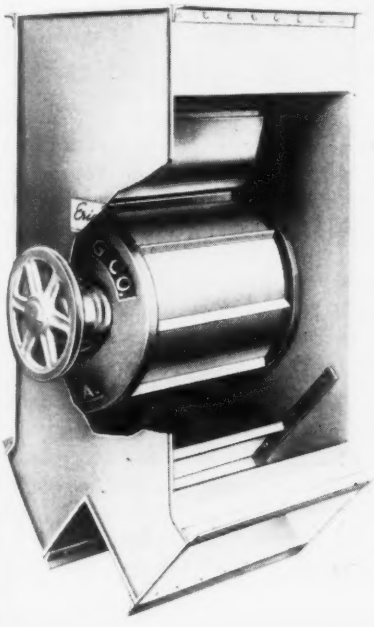


Operator can change casting size quickly by opening hinged top cover and removing mold. Mounting of the runner pot on the hinged front door eliminates the need to align the pot with the mold after each casting has been removed. Water sprays cool the mold, permitting complete con-

trol of mold temperature. This control permits production of gray iron, cylindrical castings in hot metal molds held at a controlled temperature. The machine produces bushings or cylinders of gray iron, steel, bronze and aluminum on either production or job shop bases.

For More Details Circle No. 20—Page 225

**Magnetic Drums:** Eriez Mfg. Co., Erie, Pa.—Improvements and modifications designed to increase efficiency are reported by the company to have been made on all Eriez permanent magnetic drums for automatic removal of tramp iron and medium fine ferrous contamination from materials conveyed in spouts, chutes and other conveying systems not employing belts. The improve-



ments include changeable sheave sizes for various operating speeds; stainless steel shells that resist pitting and corrosion; dust-tight construction; lightweight, rigid, cast aluminum sides; adjustable feeder assemblies; smooth-running, oil sealed bearings, and extended discharge ducts. Available in two models, with or without housings, each magnetic drum consists of a revolving cylindrical shell within which a stationary, high-powered permanent magnet is located. Both models are available complete with motor.

For More Details Circle No. 21—Page 225

**Safety Goggles:** Pulmosan Safety Equipment Corp., 644 Pacific St., Brooklyn 17, N. Y.—Line of safety goggles and spectacles includes hardened lenses for chipping, grinding and impact; filter lenses for welding, burning and cutting, and special con-

HELP BEAT THE COST SPIRAL

With the cost of materials and manpower steadily mounting, there is but one opportunity left for the foundryman to keep his production costs down. The answer is found in machinery and production methods that will make it possible to produce more castings . . . better castings . . . or the same number of castings in less time. The American Sandcutter does all three. It takes only one man to operate a Sandcutter. It cuts the sand right on the molding floor. There is no hand shoveling or carrying of the sand. The Sandcutter cuts through every particle of sand again and again, breaking up all lumps and evenly distributing the bond and moisture. No lump or particle can escape the whirling blades. The sand is thoroughly mixed, aerated and cooled as it is thrown into the air and tossed from side to side. It is loose, soft, fluffy and cool. It riddles fast, rams easily and vents perfectly. Because the Sandcutter conditions the sand so thoroughly, molders can put up more molds per day. The uniformity of the sand makes uniform castings. And, due to the speed and simplicity of operation of the Sandcutter, the cost of conditioning the sand per floor is extremely low. You can keep your costs down . . . with a Sandcutter.

*Write for literature on any of these four Sandcutter models: Light floors (Model AM); Medium floors (Models AA and M); Heavy floors (Model K).*

American SANDCUTTER®
WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka 2, Ind.

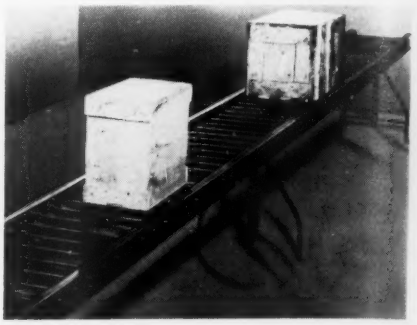
structions for dusts and chemicals. They are available in either metal or plastic frames, with or without side screens. All are contour designed, including types to fit over prescription glasses.

For More Details Circle No. 22—Page 225

**Wheel Block:** Calumet Steel Castings Corp., 1636 Summer St., Hammond, Ind.—Truck and trailer wheel block of high-strength cast alloy steel is designed to hold heavy vehicles and loads. Furnished with cast-in holes on the bottom plate to permit nailing it to freight car or truck floors and to shipping platforms to insure positive blocking of heavy equipment during shipment, the block has a wide, curved tread plate said to give good contact with the tire and to assure even, safe distribution of loads. Lack of sharp corners and projecting surfaces insures against accidental cutting or snagging of tires. Features include a heavy center rib support designed to resist maximum thrust; heavy, steel gripper teeth on the bottom plate to keep the block from slipping, and provision for a hook or chain attachment to a cast-in hole on the center rib support. Weight is 12 lb.

For More Details Circle No. 23—Page 225

**Roller Conveyor:** Sage Equipment Co., 31 Essex St., Buffalo 13—Line of heavy-duty roller conveyors with rollers 2¼ in. in diam has been added to company's line of 1¼ and 2 in. diam standard duty roller conveyors. For use where capacity



up to 600 lb per roller is required, the new conveyors are available in standardized widths from 6 to 36 in. in 5 and 10 ft and 90 degree curves. Rollers have wall thickness of 3/16 in. They may be equipped with standard, grease-packed or dust-sealed bearings.

For More Details Circle No. 24—Page 225

**Colorimeter:** Bausch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.—Monochromatic colorimeter for determining color densities and percentage of light transmission in quantitative analyses employs transmission-type interference filters

that provide high spectral purity and insure detection of small absorption bands in the transmission curve. Because filters utilize metallic films evaporated on glass surfaces, they will not deteriorate with age, according to the manufacturer. Control is by two knobs. When the filter hold-

(*Continued on page* 234)


# Need core plates that SPEED PRODUCTION?

## . . . then use TRANSITE CORE PLATES that are light-weight and easy to handle

You'll find two important reasons why Transite* Core Plates mean faster production: First, core makers can handle more plates with fewer trips. Second, Transite Core Plates are easier to clean . . . core wash, sand, etc., do not adhere to them as readily as to other core plate materials.

*Here are* more *reasons why you can profit by using Transite Core Plates:*

**They give long service**—Made of tough, fibrous asbestos and cement, Transite Core Plates resist shock and corrosion—will not crack or break easily—require little, if any servicing. *Performance records of 8, 10 and 12 years are not unusual.*

**They maintain accuracy** — Transite Core Plates stay smooth through long, hard service. Foundrymen who have used them for years report minimum warpage.

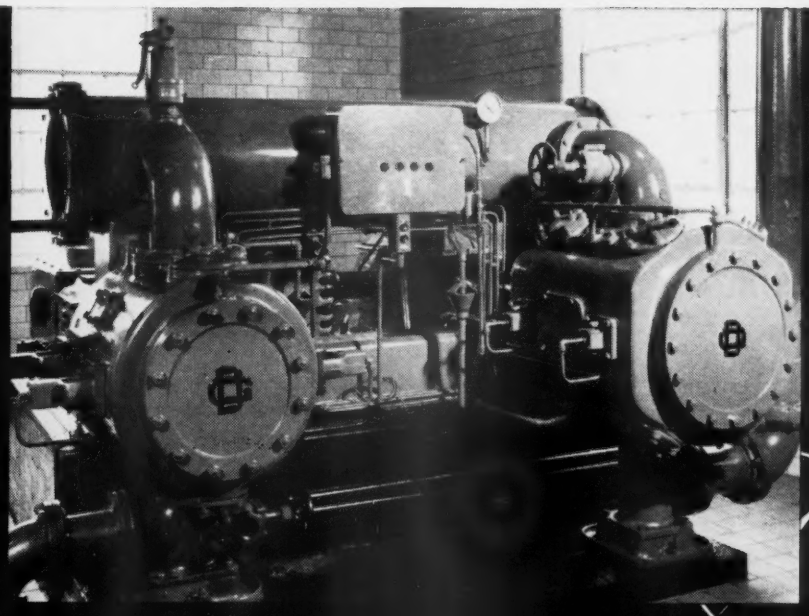
For cores of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details write Johns-Manville, Box 60, New York 16, N. Y.

*Reg. U. S. Pat. Off.

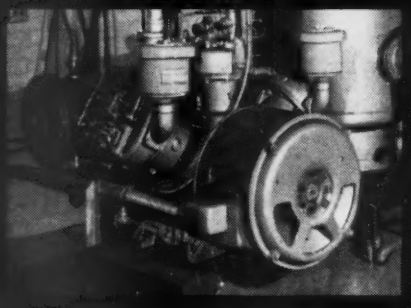
**Johns-Manville TRANSITE CORE PLATES**

**Made of Asbestos**

Model HA
468 to 1854 c.f.m. displacement
Bulletin HAC-36



Model WB
142 to 686 c.f.m. displacement
Bulletin WB-10



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|---|---|
| PRESSURE: | Holding up |
| OUTPUT: | Up to capacity |
| EFFICIENCY: | Right up there |
| OPERATION: | Downright economical |
| MAINTENANCE: | Trifling |

For everyday compressor reports like this—
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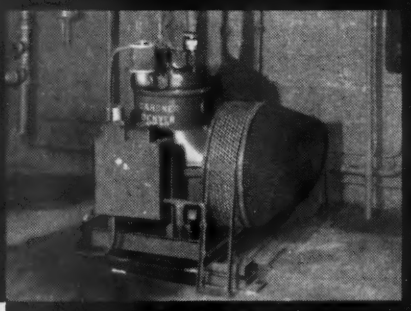
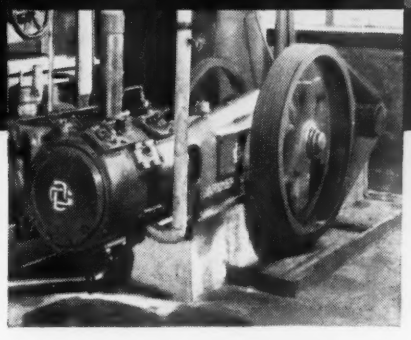
Write for descriptive bulletins.



Model AA
32 to 183.6 c.f.m. displacement
Bulletin AA-6

Model RX
89 to 1292 c.f.m. displacement
Bulletin HAC-40



GARDNER-DENVER SINCE 1859

Gardner-Denver Company, Quincy, Illinois
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14 Curity Avenue, Toronto 13, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

## Coal and Ashes in N. & F. Silos

The coal is crushed, then conveyed by bucket elevator to the tops of the two large silos (CC). Withdrawal to the boiler room is via a screw conveyor.

Ashes are moved by a bucket elevator and drag chain conveyor to the small silo (A). Trucks are loaded through a drop gate.

The installation is at the Larkin Terminal Warehouse in Buffalo.

This is an example of collaboration between machinery manufacturers and ourselves in engineering systems for handling and storing flowable bulk materials. We'll be glad to study your problem.

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AUTOMOTIVE PATTERN Company

*Wood and Metal Patterns*

18840 John R. St., Detroit, Michigan


(*Continued from page 232*)

er, which accommodates either 2 x 2 or 1 x 1 in. filters, is withdrawn from the light path, light is automatically cut off from the photoelectric cell, thereby avoiding damage to the cell. Scale gives direct transmission and density readings by a floating spotlight. Precalibrations have been selected to cover commonly employed procedures.

For More Details Circle No. 25—Page 225

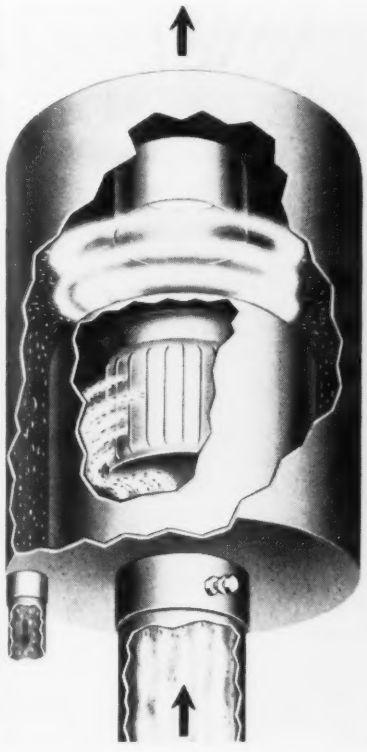
**Pneumatic Transmitter:** Bristol Co., Waterbury 20, Conn.—Miniature pneumatic transmitter measures and transmits readings of temperature, pressure, vacuum, differential pressure and liquid level to recording, indicating and controlling receivers, including miniature type receivers. Transmission is by air pressures of 3-15 psi that have a direct relation to the measured quantity. The device uses the company's measuring elements and a transmitting element with one pivot and no flextures, thereby virtually eliminating friction and lost motion. It is said to be sensitive to changes in the measured value of as little as 0.03 per cent of range, including reversal. Pneumatic relay has an output capacity of

3.0 scfm. Transmitter weighs 7½ lb, is weatherproof, can be installed in any location and will operate in any position.

For More Details Circle No. 26—Page 225

**Exhaust Head:** V. D. Anderson Co., Dept. EH, 1935 West 96th St., Cleveland 2—Exhaust head to clean up exhaust steam and vapors dis-

charged to the atmosphere from industrial stacks has no moving parts or filters. Manufacturer claims it is virtually maintenance free. Entrainment-laden vapor entering the puri-



fier is engaged by a stationary centrifugal element which imparts a controlled, rapid, rotational motion to the vapor. This action guides dirt particles, oil and water outward to the walls of the purifier, from which they are drained and ejected. Clean, dry vapor continues upward and is discharged to the atmosphere. The greater the velocity, the greater the operating efficiency, according to the company. The unit is guaranteed 99 per cent effective. Standard models have a slip-on or flange connection for the stack and a threaded connection for the drain, a fabricated steel body and a stainless steel centrifugal element.

For More Details Circle No. 27—Page 225

**Fire Extinguisher:** American-La-France-Foamite Corp., Elmira, N. Y. —One-man, wheeled fire extinguisher for large scale B and C fires has a capacity of 150 lb of free flowing, quick smothering, dry chemical. Discharge range is 20-25 ft, and the density of the dispersion of its sustained pressurized discharge promotes a cooling effect which insulates the operator and enables him to move up on the fire. Expellent is dry nitrogen, discharged at sustained operating pressure of 200 psi. All the contents can be discharged in 45 seconds, but the nozzle lever has a spring-loaded mechanism which permits opening or

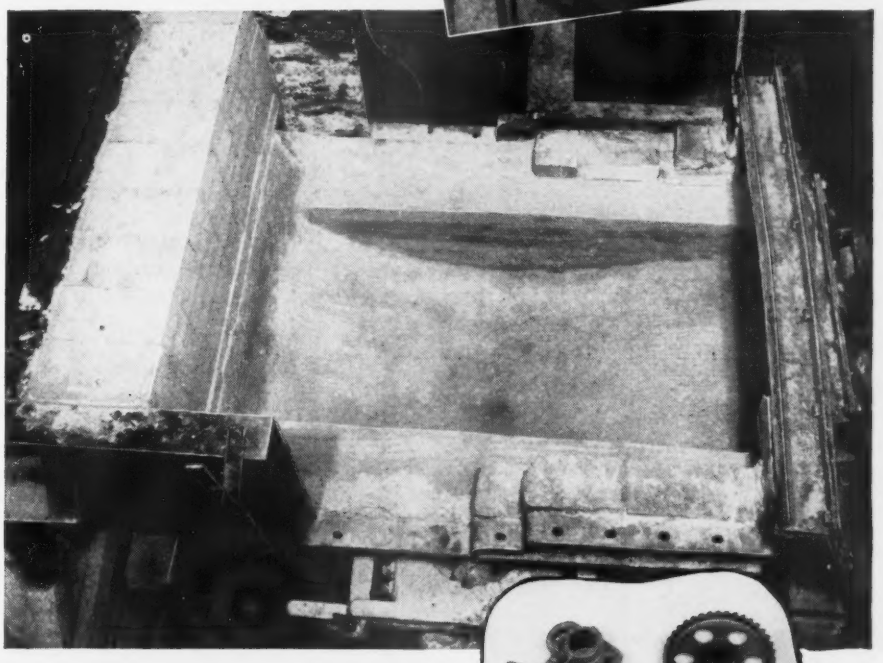

# FRANTZ MFG. CO.

**USES**

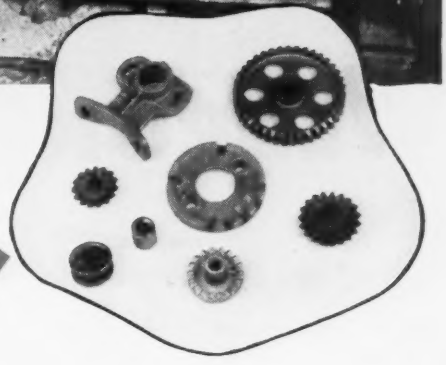
**SHAMVA®**

**SM-65**

**HERE**



**TO BOOST PRODUCTION HERE**



To produce the metal for their intricate washing machine parts castings, Frantz Mfg. Co., of Canton, Ohio uses a 1000 lb. Sklenar furnace. Gray iron is tapped at 2700° after a heat of 1 hour. Previous to using Shamva cement, Frantz was getting 53 heats with fireclay brick. After switching to Shamva cement, furnace life was increased to 203 heats, and this number has been repeated over and over for several years.

Shamva Mullite Cements, Brick and Shapes have been giving similar outstanding performances consistently. Perhaps you can profit from the Mullite story. Our field engineers will be glad to tell you about it.

## THE MULLITE REFRACTORIES CO.

**SHELTON, CONN.**

In Canada, Shamva Products Co., Ltd., Niagara Falls, Ontario.

# Recirculation Heating Produces More Uniformly Dried Cores

Get This Catalog

Stronger and more uniform cores are baked in Gehnrich Ovens, batch or conveyor type, heated by recirculating hot gases.

**W. S. ROCKWELL COMPANY**
2263 Eliot Street • Fairfield, Conn.

# WEDRON RIGID SCREENING CONTROL FOR BETTER FOUNDRY SAND

• When you use Wedron sand, no matter what your screen specification, you can be sure of highly uniform rounded grain sand. This complete uniformity gives you sand that you can count on to produce the correct quality castings to meet your specifications. Wedron sand, because of its rounded grains, greatly reduces the cutting out of core boxes for more economical production.

Wedron foundry sand is available in several grain sizes for best results in every type of casting method.

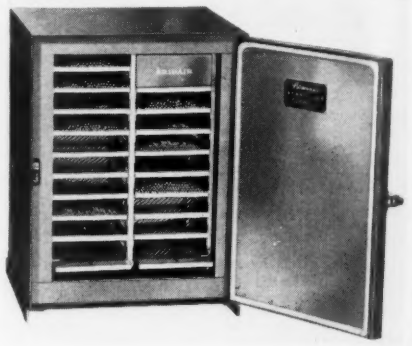
- **Uniform screen sizes**
- **Rounded-grain for less wear on core boxes**
- **Ground sand for lost-wax method**
- **Special grades for shell-molding**

MINES AND MILLS IN THE OTTAWA-WEDRON DISTRICT
**WEDRON SILICA COMPANY**
38 SOUTH DEARBORN STREET, CHICAGO 3, ILLINOIS


closing the nozzle at operator's option. The machine carries the inspection and approval label of Underwriters' Laboratories, with B and C classification.

For More Details Circle No. 28—Page 225

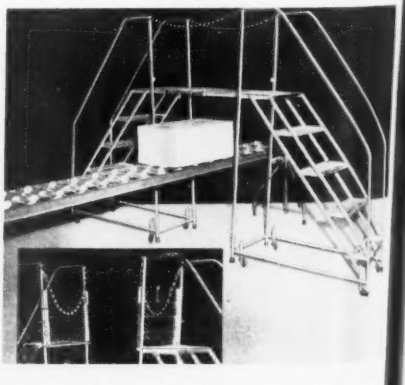
**Electrode Stabilizer:** Fred C. Archer Inc., 606 West Wisconsin, Milwaukee—Stabilizer which employs intake breather to dehydrate



incoming air chemically is said to maintain low hydrogen properties of low-hydrogen welding electrodes. The moisture that can cause poor quality welds if it is picked up by electrodes is eliminated, and low hydrogen, stainless steel and certain mineral-coated electrodes are protected because they are always surrounded by fast moving, heated, dry air. Temperatures are adjustable from 175 to 550° F.

For More Details Circle No. 29—Page 225

**Conveyor Walk-Over:** Ballymore Co., Wayne, Pa. — Ladders equipped with connecting walkway are said to eliminate passage blocks and inaccessibility of areas above conveyors. Walkway can be folded up so that the ladders can be used for normal requirements. Of standard size, the steel ladders come in



various heights and in two types. One for permanent or semipermanent installations has rubber tipped legs only; the other is equipped also with casters that facilitate movement

When a person steps on the ladder, the casters automatically retract and the rubber-tipped legs engage the floor firmly.

For More Details Circle No. 30—Page 225

**Welding Helmet:** United States Safety Service Co., 1215 McGee St., Kansas City, Mo.—Welding helmet made of Fiberglas is said to be strong and durable, but very lightweight. Helmet has a position hinge to lock it in raised or working position and is adjustable to fit any head size. The one-piece, seamless

shell is resistant to warping from heat and moisture and meets the ASA code for electrical conductivity and strength.

For More Details Circle No. 31—Page 225

**Welding Blowpipes:** Linde Air Products Co., Division of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17—Two welding blowpipes feature synthetic "O" rings that seal each welding head to the blowpipe handle, eliminating metal-to-metal gas seals. The "O" rings also makes possible the use of quick-change welding heads that snap in place and are held to the handle by a hand-tightened connection nut. One of these blowpipes is designed for continuous, heavy duty welding and heating of practically any metal from 32 gage to more than 1 in. in thickness. The other, 1½ in. shorter, is for users with a large volume of welding work on material from 32 gage to ⅝ in. thick. Both are said to be highly resistant to flashbacks, their flame stability resulting partly from the use of a coiled oxygen delivery tube in the blowpipe handle that cushions any back flow of gases and permits a steady flame, regardless of valve settings.

For More Details Circle No. 32—Page 225

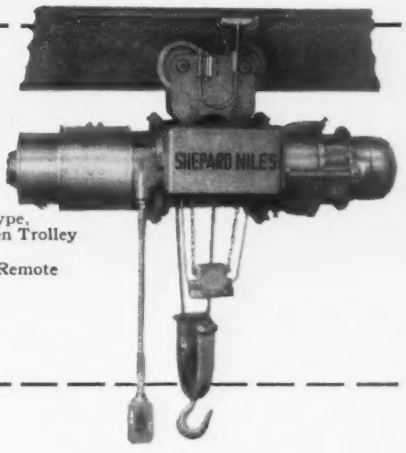

# SOLVE MANPOWER PROBLEMS *with a* SHEPARD NILES Electric Hoist

● One man replaces many—and moves more goods faster—with a Shepard Niles Electric Hoist! These rugged hoists free floor space for production, put waste ceiling area to work. They enable an older man, woman or youth to handle heaviest loads with ease.

Learn how a Shepard Niles Hoist—in light, medium or heavy capacity—fits into your production picture. Call in the Shepard Niles representative—he'll help you select the right capacity and controls for your handling job.

## 2 FAMOUS HOISTS

### Heavy Duty SHEPARD NILES Hoist

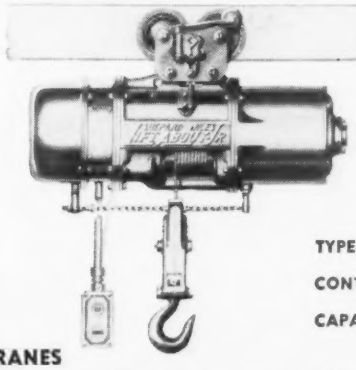



**TYPES:** Lug Suspension, Hook Suspension, Base Type, Push Trolley, Geared Trolley, Motor-driven Trolley

**CONTROLS:** Pendant Rope, Push Button, Outrig, Remote

**CAPACITIES:** 500 to 40,000 lbs.

**SPEEDS:** To meet your requirements—Write for latest bulletins.



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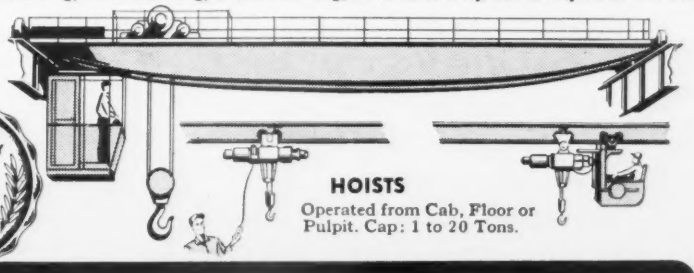

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## Nonferrous Founders

(*Continued from page* 115)

minum Scrap were made. In addition, advisory committees within both the Copper and Aluminum Divisions were established by the National Production Authority.

Perhaps the most outstanding achievement by the Washington Contacts Committee was the acceptance of its recommendation for a foundry branch within the Copper Division, one staffed with qualified personnel from the industry. This was the only foundry branch organized by NPA.

In December, 1950, the newly organized Office of Price Stabilization requested the Washington Contacts Committee to recommend a foundryman to help draft the pricing orders for castings. Edward J. Metzger, a member of the society's Cost Committee, agreed to serve, and through his efforts the first formula pricing order was prepared and issued.

The society's recommendations for a Nonferrous Casting Industry Advisory Committee were accepted, and William A. Gluntz was named chairman. The effectiveness of this group is shown by the recent revocation of the foundry pricing order and the decontrol of scrap and secondary metals. This decontrol order was presented by the nonferrous group on Feb. 3, 1953, and it is admitted by OPS to have been the spark for final action.

The respect and effectiveness of the society is shown by the many other branches of government, including the military, in referring contemplated actions to the society for comment and recommendations.

As a service to its members, the society prepares *The Crucible*, a small monthly publication which carries comment on national and local affairs of interest to the industry. The society also maintains a department for the sale and purchase of surplus equipment which is reported to be performing a valuable service.

Periodic surveys of labor rates by the society are of great help to members. The fringe issue survey made twice a year is the only information of that type available in the industry. The society has been considering means for expanding and recapturing markets with the end of government controls. Other projects include better public relations, improved sales techniques and practices research.

The society has co-operated actively with other foundry groups, including the Foundry Educational Foundation and the National Castings Council.

Up to the present time, 12 chapters in various parts of the country have been organized and more are contemplated. The activities of these

### TO MEET AT CHICAGO

Members of the Non-Ferrous Founders' Society will gather at Chicago, May 3-4, to celebrate the tenth anniversary of the society. The annual business meeting will be held Sunday afternoon, May 3 in the Walnut room of the Bismark Hotel. The annual dinner, featuring a special anniversary program, will be held at the Bismark Hotel on Monday evening, May 4.

All the past presidents, listed on pages 114-115 of this issue, will be honored guests and will be presented with plaques. Speaker of the evening will be Anthony Weitzel, columnist, *Chicago Daily News*. Entertainment and cocktail hour is being sponsored by the Chicago chapter of the society.

Since the early meetings of the society were held at the Bismark, staging the anniversary celebration there will be a little like old home week for many of the early members.

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chapters are related to those of the national organization in that they are sponsoring cost clinics, business surveys, labor information and other problems pertaining to management.

The present elected officers are: President, L. H. Durdin, Dixie Bronze Co., Birmingham; vice president, Robert Langsenkamp, Langsenkamp-Wheeler Brass Works Inc., Indianapolis; second vice president, Arthur Fischer, Fischer Casting Co., Plainfield, N. J.; executive secretary, James W. Wolfe, Chicago.

Offices of the society are located at 192 North Clark St., Chicago 1.

During the ten years of service, nine men have served the society as president: Chester K. Faunt, Christensen & Olsen Foundry Co., Chicago, Apr. 28, 1943 to Apr. 24, 1944; Roy M. Jacobs, Standard Brass Works, Milwaukee, Apr. 25, 1944 to Apr. 30, 1945; Edwin W. Horlebein, Gibson & Kirk Co., Baltimore, May 1, 1945 to May 6, 1946; Thomas S. Hemenway, Buffalo (deceased), May 7, 1946 to May 5, 1947; William A. Gluntz, Gluntz Brass & Aluminum Foundry Co., Cleveland, Oct. 17, 1947 to Oct. 21, 1948; Fred Haack Jr., Capital Brass & Aluminum Foundry Co., Chicago, Oct. 22, 1948 to Oct. 13, 1949; Walter M. Clark, D. W. Clark & Co., Boston, Oct. 14, 1949 to Oct. 13, 1950; J. D. Zaiser, Ampco Metal Inc., Milwaukee, Oct. 14, 1950 to April 30, 1952; L. H. Durdin, Dixie Bronze Co., Birmingham, May 1, 1952 to May 4, 1953. Mr. Faunt served an interim appointment as president, from July 28, 1947 to Oct. 16, 1947 to finish Mr. Hemenway's term.

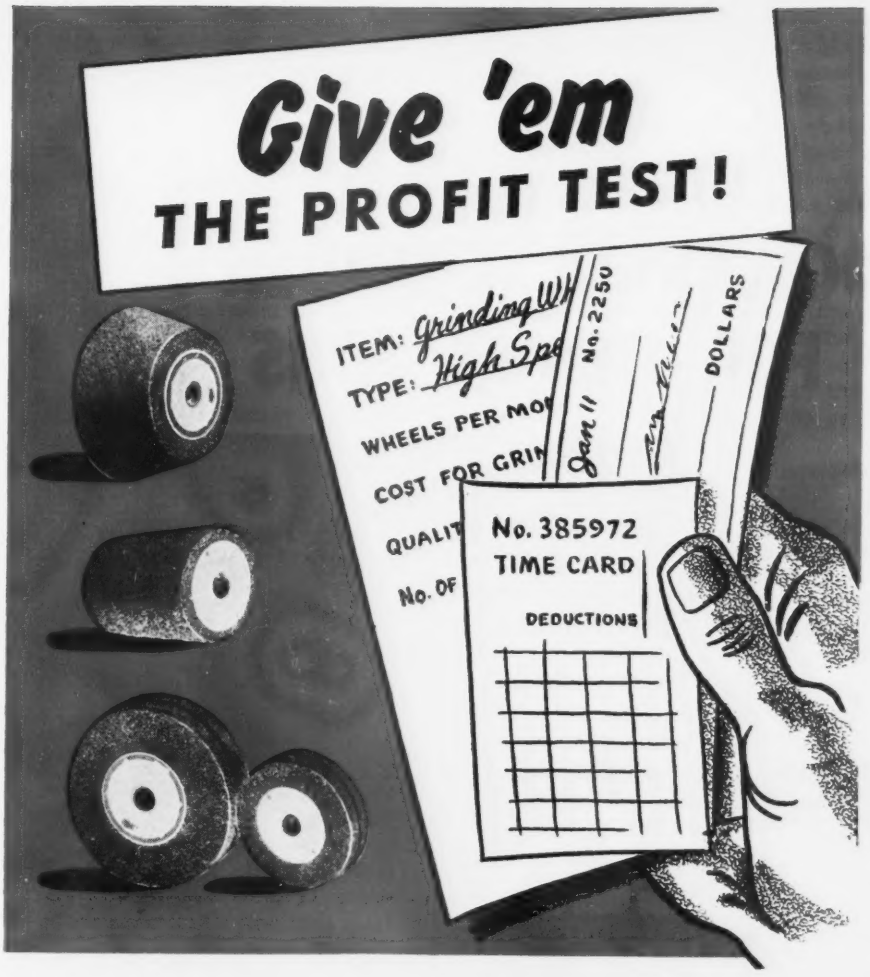
For the same period, the following have been employed as executive secretary: Gerald Buhler, 1941-1942; McClure Hadden & Ortman, Engineers, R. McClure and A. E. Pye, 1942 to 1946; James W. Wolfe, 1947 to date. Mr. Wolfe was field manager 1945 to 1947.

## Book Review

*Small Business Management,* paper, spiral bound, 213 pages, 8 x 10 in., published by Delmar Publishers Inc., Albany, N. Y. Price $2.75

Contents of this publication are based upon a course instituted and developed by New York city vocational high schools for students interested in learning the fundamentals of operating small businesses.

The material presented covers problems which are an inherent part of every small business, whether it be a florist shop, gasoline service station, machine shop, garage, appliance store or what-have-you. It is designed to provide down-to-earth practice in solving those problems.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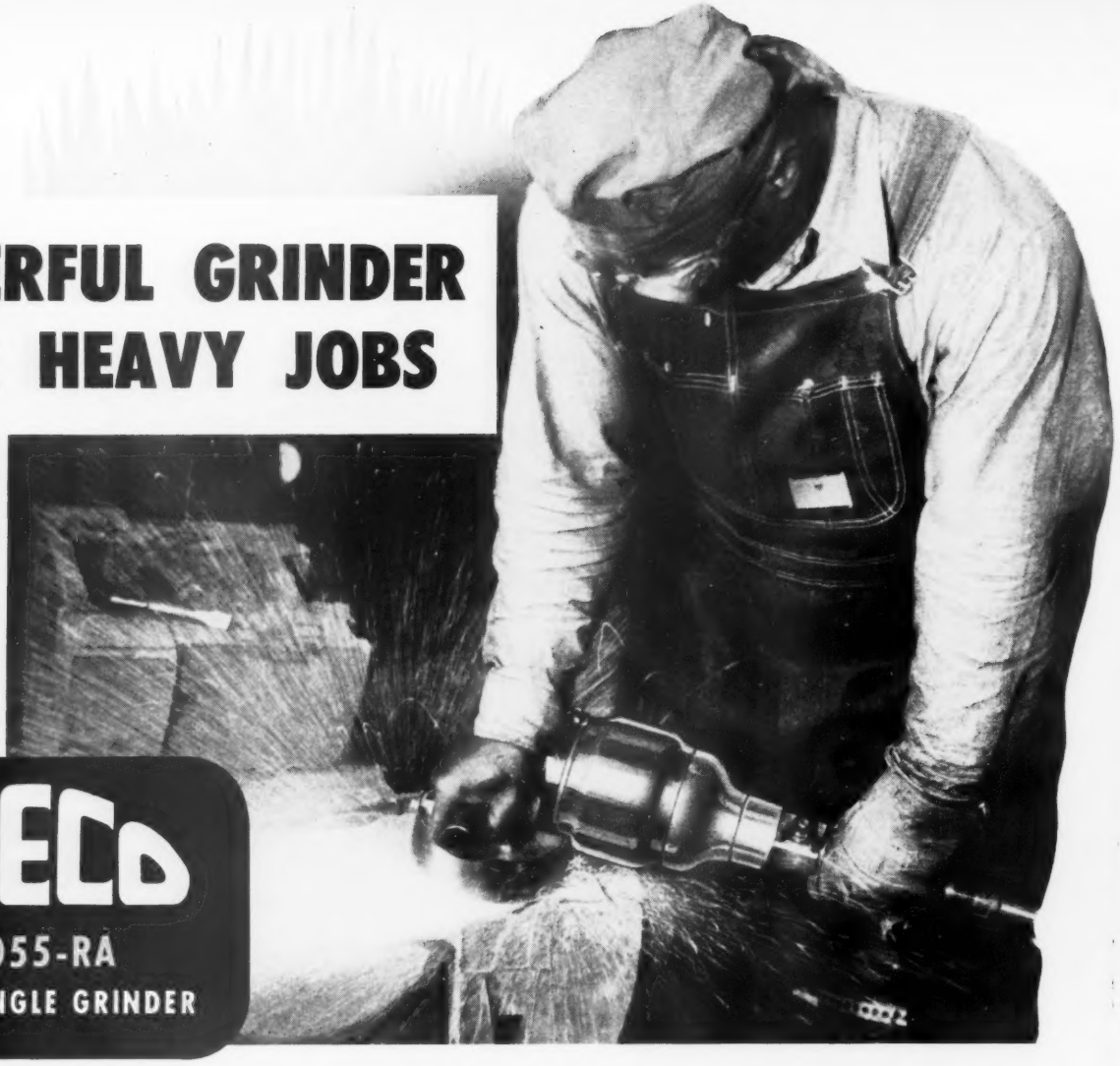

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## Calcium Carbide Injection

(*Continued from page* 91)

chill depth required. An examination of the mechanical properties of this calcium - carbide - treated iron showed an increase in tensile strength and impact value as shown in Table I. The increase in tensile strength obtained by injecting calcium carbide into an iron containing about 0.30-0.40 per cent chromium was 12,590 psi or 38 per cent.

In the case of "brake drum iron," containing about 0.30 per cent molybdenum, 0.25 per cent chromium, and 0.30 per cent copper, the gain was 9,870 psi or 29 per cent. For Lyncast iron containing about 0.70 per cent molybdenum and 1 per cent copper, the tensile increase was 6,360 psi or 12 per cent. The calcium carbide injection rate was varied from 10.0 to 30.0 lb of calcium carbide per ton of iron. This feed rate was accomplished with a nitrogen flow of 100 cu ft per hour at a pressure of 10 to 15 psi, or 12.5 cu ft of nitrogen per ton of iron treated.

### Proper Conditions Essential

The efficiency of desulphurization with calcium carbide depends on a number of conditions. For example, treatment in a bath lined with acid refractories may result in a reversion of the sulphur from the slag formed back into the iron. Also, the particle size of the calcium carbide and the depth of the injector nozzle in the iron bath have a definite effect due to the variation possible in the area of surface of the calcium carbide in contact with the sulphur in the iron bath. Figs. 4 and 5 show heats run in the Plow Foundry 48-in.-diam cupola during which calcium carbide was injected into an acid lined forehearth. The efficiencies obtained were 17.8, 12.5, 3.8, and 7.6 lb of calcium carbide injected per pound of sulphur removed. The wide range of efficiencies shown in these heats are due to variation in the operating procedures and inaccurate means of measuring the rate of flow of the calcium carbide. However, from previous work, it may be stated that with the proper nozzle depth and operating conditions, it will ordinarily require about 10 lb of calcium carbide to remove 1 lb of sulphur from an iron bath in a ladle or forehearth.

To desulphurize from 0.12 per cent sulphur to 0.08 per cent sulphur requires the removal of 0.04 per cent sulphur from the metal or the removal of 0.8 lb of sulphur per ton of metal. This would require: 8 lb $CaC_2$ estimated at 8 cents per lb, or 64 cents per ton for $CaC_2$; 12 cu ft $N_2$ at 1 cent per cu ft, or 12 cents per ton for $N_2$. Total cost of materials would be 76 cents per ton.

In addition, there are the costs of injection equipment, injection tubes, and a mechanical rabble to take into consideration when desulphurizing with calcium carbide. The mechanical rabble may be desirable because the slag formed is dry and powdery and cannot be made viscous enough to flow. It must be raked off. Therefore, it may be seen that for desulphurization in the range generally used in the gray iron foundry, it will be necessary to cost-study each individual application to determine whether it will be economical to desulphurize with calcium carbide.

Figs. 4 and 5 show that it is possible to reduce the sulphur content of the metal to a low level. Also, as is seen in Fig. 5, it is possible to control the sulphur content in the ranges of 0.02 per cent to 0.03 per cent and 0.03 per cent to 0.04 per cent, as desired by varying the amount of calcium carbide injected. Other test work done at the Airco Laboratories and at the Radford plant show that it is possible to reduce the sulphur content to less than 0.005 per cent if calcium carbide is injected at the rate of 10 lb of calcium carbide per pound of sulphur removed.

In the manufacture of spheroidal

# FOUNDRY FACINGS ASSOCIATION

## *Discusses Noise, Air Pollution*

By FRANK STEINEBACH
*Editor, FOUNDRY*

COMMITTEE reports and consideration of problems of the industry featured a meeting of the Foundry Facings Manufacturers' Association held at the Standard Club, Chicago, Feb. 11. L. H. Heyl, president of the association and vice president and general manager, Federal Foundry Supply Co., Cleveland, presided.

L. H. HEYL

Special interest centered on a paper, "Noise and Air Pollution," by Warren A. Cook, director, division of Industry Hygiene and Engineering Research, Zurich American Insurance Companies, Chicago. Mr. Cook urged attention to any complaints of air pollution in the neighborhood of an industrial plant. An interest should be indicated by looking into the matter and determining whether something practical can be done to improve the condition. It also is important that improvements be undertaken in a manner that will indicate to the neighborhod that something is being done.

While noise can cause complaints from neighbors, the principal problem is in connection with the effect on the hearing of employees. Increasing attention is being given to reduction in the amount of noise, with methods falling into one of the following six general classifications: 1—Reducing source of noise; 2—Moving workers farther from noise; 3—Providing barriers; 4—Reducing reflected noise with absorbing material; 5—Reducing the duration of exposure; 6—Using ear protectors.

Mr. Cook stated that an important phase in meeting problems of noisy industries is the determination of the hearing acuity of a person when starting to work and after various periods of exposure to noise. An increase is noted in the firms giving pre-employment audiometer tests. It is recommended that these be repeated after a few weeks, and monthly for six months. If the acuity of hearing falls off appreciably over that period, the person should be removed from the noisy operation. In most cases it may be expected that the hearing will return.

Following luncheon, mutual problems of the FFMA and the American Foundrymen's Society were discussed. Guests participating in this discussion included the following AFS officers and staff members: President I. R. Wagner, Vice President Collins L. Carter, Past President Walter L. Seelbach, Secretary-Treasurer William W. Maloney; Technical Director S. C. Massari, and William N. Davis, director of safety and hygiene.

Quality

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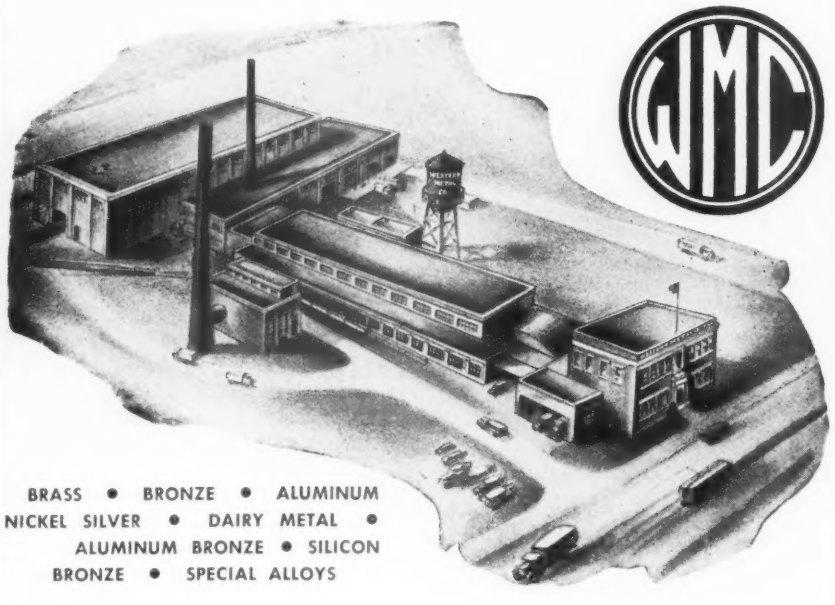

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graphite cast iron by additions of nickel-magnesium alloys, according to present commercial practice, it is necessary not only to control the sulphur content of the iron to be treated within very close limits, but also it is desirable and economical to maintain the sulphur content as low as possible. For production of spheroidal graphite cast iron with tensile strengths from 47,000 psi to 100,000 psi at brinell hardness levels of 210 to 275 in a 1-in. keel block as cast,

P. M. HULME H. E. HENDERSON

**THE AUTHORS**

**Harvey E. Henderson** received his B.S. in 1939 and his M.S. in 1940 in chemical engineering from Virginia Polytechnic Institute. He joined Lynchburg Foundry Co. in 1947 as a metallurgist. In 1948 he was promoted to plant metallurgist, and since 1951 has been research and development metallurgist.

**Philip M. Hulme,** graduated from Massachusetts Institute of Technology in 1926, was with the Anaconda Copper Co. until 1943, when he joined Air Reduction Co. Inc. as a metallurgist. Later he was promoted to project engineer, and now is section head of the Metallurgical Process Division of the company.

the residual magnesium in the treated iron must be maintained within the limits of 0.045 per cent to 0.055 per cent or a range of 0.01 per cent. On the assumption that it requires 0.01 per cent magnesium to remove 0.01 per cent sulphur from the base iron, then the sulphur content of the iron before treatment should be controlled at a fixed level of plus or minus 0.005 per cent in order to produce spheroidal graphite cast iron with consistent properties.

These results led to a decision to redesign the trough and forehearth arrangement at the Plow Foundry cupola. The new design provides for a bath of iron 22 x 17 x 18 in. deep which contains 1500 lb of iron. This arrangement can be seen in Fig. 7 which shows the injection of calcium carbide into the bath.

Prior to this time, the results in the manufacture of spheroidal graphite cast iron were very erratic due mainly to the variation of the sulphur content of the base iron, as

pointed out above. So, it was decided to desulphurize the base iron with calcium carbide before treatment with nickel-magnesium alloy. Table II gives the results of four heats of spheroidal graphite cast iron made in this manner. The feed rate used in this test was about 20 lb of calcium carbide per ton of iron treated. The mechanical properties of the iron produced in the test runs were taken from 1-in. keel blocks as cast. The range was from 72,400 psi tensile strength at 8.0 per cent elongation and 207 brinell hardness to 110,625 psi tensile strength at 3.5 per cent elongation and 228 brinell hardness, depending upon the nodulizing alloy used. Overall, these four heats gave the most consistent properties of any spheroidal graphite cast iron yet produced in the Flow Foundry cupola and will meet customer specifications in all respects.

Although the reduction of the sulphur content of iron is the most obvious result of treating with calcium carbide, it became clear early in the development work that calcium carbide injection produced other effects which might prove important. For example, it was found that the tensile strengths of arbitration test bars taken after injecting carbide into hypereutectic irons melted in a 500-lb basic-lined induction furnace were invariably much higher than on bars taken from the same heat before injection. This increase in tensile strength amounted to several hundred per cent. The following data show three heats wherein this phenomenon was noted.

| Heat No. | Tensile Strengths Before Treatment, psi | Basic Crucible After Treatment, psi |
|---|---|---|
| 270 | 12,875 | 50,750 |
| 271 | 12,550 | 55,200 |
| 272 | 12,200 | 53,600 |

This effect, which has been termed "upgrading," is much less pronounced when the injection is carried out in an acid-lined crucible as shown in the following table.

| Heat No. | Tensile Strengths Before Treatment, psi | Acid Crucible After Treatment, psi |
|---|---|---|
| 278 | 14,400 | 17,500 |
| 280 | 14,700 | 16,850 |

Since the material of the basic-lined crucible was largely magnesia, it was suspected that this lining played a part in the upgrading effect. Accordingly, heats were run on a base iron of approximately the same composition to determine the effect of the crucible material and also the effect of adding magnesium oxide to the carbide and injecting the mixture. Table III shows the results obtained in both a basic-lined and an acid-lined crucible. In general, the upgrading effects are more pronounced in the combination of basic lining plus calcium carbide than in the combination of acid lining plus the mixture of calcium carbide and magnesium oxide.

Since upgrading in an acid lining requires a large amount of carbide alone, or is somewhat erratic when the carbide-magnesia combination is used, it can be concluded that the upgrading process should always be carried out in a basic-lined vessel and perhaps most advantageously with small additions of fine magnesia mixed with the carbide. (Magnesia additions alone have no upgrading effect whatever. An addition of 30 lb per ton succeeded in raising the tensile strength from 14,250 psi to only 14,450 psi, which indicates little or no effect

Hypoeutectic irons treated with carbide in a basic lined vessel are also upgraded, but the effect is not nearly so pronounced as with hypereutectic irons. The degree of upgrading of hypereutectic iron is

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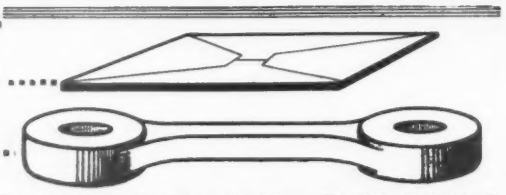

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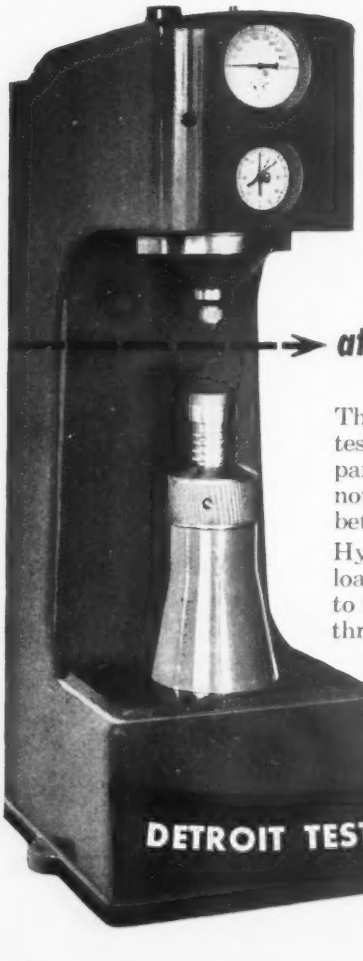

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markedly affected by variation in the quantity of ferrosilicon added as a late inoculant. However, variations in the late addition have only their normal effect unless the metal has previously been treated with carbide or carbide-magnesia.

Fig. 6 shows on one chart how heats of the same hypereutectic composition may be treated after melting to obtain a wide variety of structures and physical properties. Some structures and physical properties can be obtained by several variations in the treatment method as noted by (1), (2), or (3) in the treatment column opposite the structures and the corresponding mechanical properties. Treatment (1) is that used to obtain the actual structure and physical data shown. However, by using either of treatments (2) or (3), almost identical results can be achieved. Some of the treatments noted have already been discussed above, the others will be taken up below.

The structure of calcium carbide, or calcium carbide-magnesia treated iron exhibits typical flake graphite structure in the lower degrees of upgrading. As the degree increases, due to the use of more treating agent or an increased amount of inoculant, the graphite flakes get shorter and more compacted. They then begin to curl, and finally, some spheroids appear. The ultimate in upgrading is an iron containing graphite in complete spheroidal form.

As illustrated in Fig. 6, the fully nodular structure can be approached by the carbide or carbide-magnesia treatment. However, to throw all of the graphite into 100 per cent nodules, either considerable amounts of treating agents, or recourse to the heat treatment discussed below is required. To obtain a ductile, fully spheroidal structure in the as-cast state with reasonable quantities of treating agents requires another factor which has been given the name of "nodulization impelling agent." In other words, while it is possible to get almost to the spheroidal state with carbide treatment alone, another agent is needed to impel the structure to go completely over to the spheroidal form. The amount of such agent is relatively small, and is insufficient, by itself, to effect the occurrence of spheroidal graphite. However, the combination of the calcium carbide in a considerably larger amount and such agent consistently produces a wholly spheroidal graphite structure.

The first impelling agent tried was nickel-magnesium. Table IV shows several heats using no treatment, nickel - magnesium alone, calcium carbide alone, and calcium carbide followed by nickel-magnesium.

Table V compares nickel-magnesium alloy alone, carbide plus magnesia, and carbide plus magnesia plus nickel-magnesium alloy.

Other nodulization impelling agents may be used. For example, cerium in the form of mischmetal may be used instead of, or in addition to, the nickel-magnesium alloy. Rare earth oxides of the lanthanum series may be used successfully in conjunction with the carbide process. Since these oxides can be obtained at a much lower cost than an equivalent quantity of rare earths in the form of mischmetal they offer a very attractive form of nodulization impelling agent.

Table VI illustrates the effect of adding a small percentage of rare earth oxides to the calcium carbide plus magnesia treating mixture. In some cases, the magnesia may be omitted and good results obtained with carbide and rare earth oxides alone. Injecting the rare earth oxides without carbide has no upgrading effect whatever.

### Could Compare Results

Early last fall, the injection equipment was moved to the Radford, Va., plant of the Lynchburg Foundry Co. It was then possible to compare the results of treating cupola melted iron, both acid and basic, with the results obtained in the Air Reduction Laboratories on induction melted iron of approximately the same chemical composition.

The injection equipment was set up as shown in Fig. 9. The iron to be treated was tapped from a teapot ladle into a 3000-lb ladle which was transported by lift truck to the treating station. The injection nozzle was lowered into the ladle as shown in Fig. 10 and the amount of calcium carbide and/or other materials desired blown into the metal. The feed rate generally used was in the range of 2 to 4 lb of $CaC_2$ and/or other material per minute fed in with a nitrogen flow of 100 cu ft per hour. A number of irons of different chemical analysis were treated with calcium carbide alone or with calcium carbide mixed with nodulization impelling agents. The improvements in the mechanical properties of a mixture of acid and basic cupola melted irons of "caustic pot" composition may be seen in Ladles Nos. L-19 and L-20 as shown in Table VII. By injecting 1.3 per cent calcium carbide and 0.05 per cent rare earth oxides followed by a late ferrosilicon addition of 1.5 per cent, the tensile strength was raised 18,300 psi, or a gain of 100 per cent. The brinell hardness increased from 143 to 170. Ladle No. L-20-3 was treated by in-


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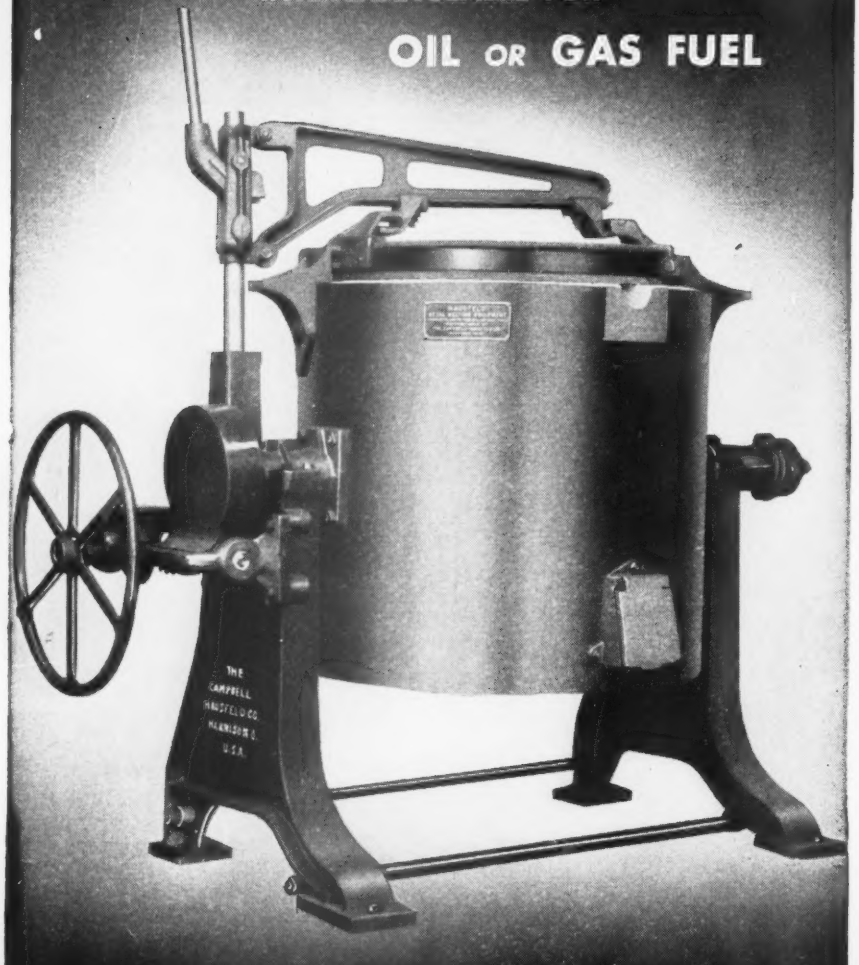

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jecting 1.5 per cent calcium carbide and 0.16 per cent rare earth oxides followed by a late treatment of 0.5 per cent No. 2 nickel-magnesium alloy and 1.25 per cent ferrosilicon. The properties obtained by this treatment (103,600 psi tensile, 69,000 yield point, 2.5 per cent elongation, 2.3 per cent reduction of area, and 262 brinell hardness number) were better than those obtained by treating the same base iron in the usual method by an addition of 2.5 per cent nickel-magnesium alloy. Fig. 11 shows the change in the appearance of the fractures of this treated iron. The other ladles listed in Table VII are of acid cupola melted "pipe iron" composition. The improvement in physical properties may be seen graphically in Figs. 12 and 13. Here, also, note the tremendous influence of a small percentage of magnesium oxide and the further improvement with rare earth oxides. For this composition, the best upgrading result was obtained in Ladle L-38-4, treated by injecting 1.5 per cent calcium carbide with 0.25 per cent magnesium oxide and followed by a late ferro-silicon addition of 1.5 per cent. The tensile strength was raised 174 per cent and the brinell hardness increased from 170 to 248.

**Summary and conclusions** — The general interest of this new metallurgical process of calcium carbide injection may be divided into four fields.

1. Desulphurizing from 0.10-0.20 *per cent sulphur to* 0,07-0.08 *per cent sulphur.* This method of desulphurizing, in the same range of other methods, offers the advantage of ease of controlling the metallurgical specification with varying materials. In other words, more certainty of reduction of sulphur from one level to a lower level is assured which enables a more versatile use of cast scrap and foundry return.

2. *Desulphurizing from* 0.10-0.20 *per cent sulphur to less than* 0.02 *per cent sulphur.* To reduce sulphur to less than 0.02 per cent sulphur in acid cupola melted iron is difficult with any of the commonly used desulphurizing agents. It is possible with magnesium or cerium alloys but they are expensive and difficult to control. With calcium carbide injection, sulphur under 0.02 per cent may be obtained economically and with little difficulty. Acid cupola iron desulphurized to such an extent with calcium carbide shows much less chilling tendency than regular iron of the same composition. This treated iron will have a lower chill depth and brinell hardness number for the same tensile strength. There is the added possibility of substituting a low-price al-

loy such as ferrochromium for more expensive alloy additions, due to this reduction in chilling tendency.

For example, for regular ASTM Class 40 iron requiring 40,000 psi minimum tensile strength in the total carbon range of 3.30-3.40 per cent, an alloy addition of 1 per cent ferromolybdenum, and 0.50 per cent V-5 alloy or 0.50 per cent ferromolybdenum, 0.50 per cent ferrochromium and 0.3 per cent ferrovanadium is required to obtain this minimum tensile. The cost of this alloy addition is $18.23 and $17.67 per ton, respectively. In the case of carbide-treated iron using 1 per cent of calcium carbide and 1 per cent of ferrochromium, the tensile strength is well above 40,000 psi, and the cost of alloy addition is $5.60 per ton, showing a savings of more than $12 per ton. That this treated iron is equal in all respects to regular alloyed iron will have to be ascertained by further tests but all indications show that it will be as good if not better.

3. *Desulphurizing to less than* 0.02 *per cent sulphur as a base for spheroidal graphite cast iron.* It is difficult to make spheroidal graphite cast iron with as-cast ductility over 3.0 per cent elongation from acid cupola melted iron not desulphurized. By desulphurizing to less than 0.02 per cent sulphur with injected calcium carbide it is possible to insure over 3.0 per cent elongation from acid cupola melted iron. Nickel-magnesium treatment of iron at this low sulphur content produces more uniform properties at lower alloy costs and enables casting thinner sections in spheroidal graphite cast iron and maintaining ductility. For example, to make engineering castings of spheroidal graphite cast iron by the present method costs $32.29 for alloys per ton of molten metal, whereas the cost of adding calcium carbide and then treat with nickel-magnesium alloy would be $11.20 per ton, or a savings in alloy costs of $21.09 per ton.

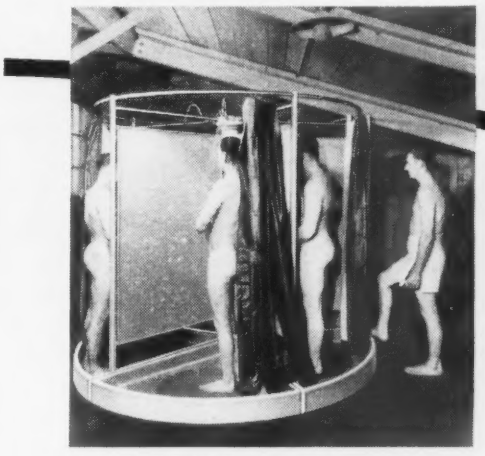
4. *To upgrade and nodulize by injecting calcium carbide or a mixture of calcium carbide and other nodulizing impelling agents.* By melting a 100 per cent steel charge in a basic cupola and subsequently treating with calcium carbide and magnesium oxide injected as a mixture, it is possible to upgrade a 25,000 psi tensile gray iron to a fully spheroidal graphite cast iron which, cast into a 1-in. keel block gives properties of 76,100 psi tensile, 5.0 per cent elongation, 3.5 per cent reduction of area and 196 brinell hardness. It is also possible to obtain these improved properties with calcium carbide and nodulizing agents, such as rare earth oxides which often have been used.

The savings in the above costs do not include the cost of the equipment necessary to employ the process of injecting calcium carbide. This equipment is sold by Air Reduction Co. Inc., New York, and is covered by patents. The processes, treating composition, and resulting products are also protected by pending and issued patents of the Air Reduction Co.

**Acknowledgment** — The authors wish to acknowledge the valuable advice and guidance given by T. W. Curry and W. W. Levi, Lynchburg Foundry Co., and Dr. A. Muller, F. T. Crego, J. M. Crockett and H. R. Fisher, Air Reduction Co., in the development of this process, and to express thanks to Lewis Graham, Lynchburg Foundry Co., for his help in obtaining and preparing data on deLavaud pipe tests.

**APPENDIX—LIST OF MATERIALS**

1. $CaC_2$—calcium carbide, Ivanhoe .0368 x 0 special dust, unless otherwise noted.
2. FeSi—75 per cent silicon grade, ⅜ x 12 mesh, unless otherwise noted.
3. NMA or NiMg—Nickel magnesium silicon alloy, Inco alloy No. 2; Mg 14.85 per cent, Ni 33.99 per cent, Cu 10.94 per cent, Si 26.43 per cent, Fe balance.
4. FeMgSi—Inco alloy No. 3, 18 mesh; Mg

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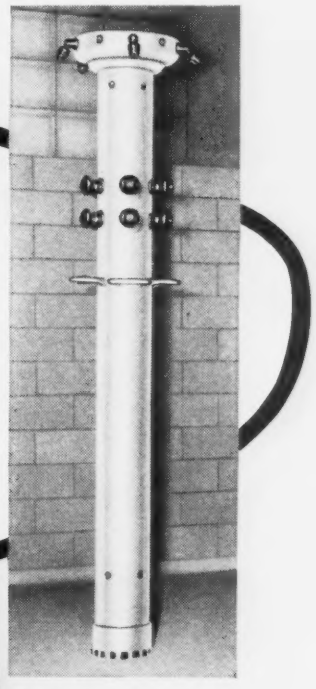

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6. MgO—Harbison-Walker-Grain magnesite; 92-95 per cent MgO.
7. R. E. O.—Rare earth oxides. CeO 48 per cent, LaO 24 per cent, Nd 19 per cent. Balance other rare earth oxides.
8. "T-Comp'd"—"T-Compound" — Rare earth oxides 80 per cent, calcium boride 12 per cent, sodium nitrate 8%.
9. FeCr—Ferrochrome, 70 per cent Cr.

Editor's note: This article is abstracted from *The Iron Worker*, publication of the Lynchburg Foundry Co. Illustrations by courtesy of that company and the Air Reduction Co. Inc.

## Booklet Treats Reducing Material Handling Costs

A booklet designed to help production management capitalize on cost savings inherent in improved handling methods, to give material handling engineers a procedure guidebook and to provide teachers and students with better course material has been published by the Industry Educational Committee, Material Handling Institute Inc.

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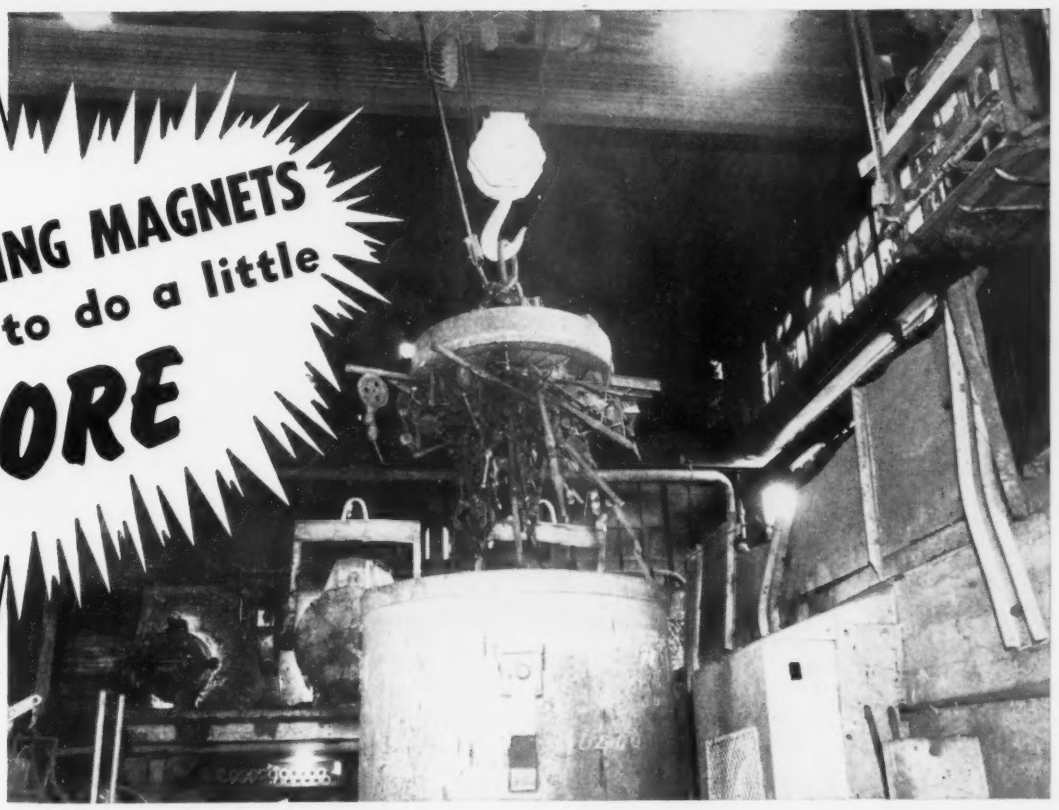
## Book Review

*Elasticity in Engineering,* by Ernest E. Sechler, Ph. D., cloth, 419 pages, 6 x 9 in., published by John Wiley & Sons Inc., New York. Price $8.50.

Written primarily for engineers working in all fields of structural analysis, this book attempts to bring into one volume the material of most interest to the engineer who needs a broad foundation based on the fundamental theories of stress and deformation of elastic bodies under load.

The first part of the book is devoted to establishing the fundamental equations and assumptions underlying the whole field of elasticity. The second part discusses the elastic problems of stable structures and shows where exact solutions are possible, indicates types of approximate solutions and sets up the boundaries between which various levels of engineering accuracy are found. The third section deals with the problems of unstable elastic structures.



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## Steel Castings

(*Continued from page 97*)

the electrode, so that they project a little beyond it, as shown in Fig. 10. The protruding flux sheath is thought to exert a directional control over the arc, as well as shielding it from direct contact with the air. Some of the materials in the coating evolve gases, particularly CO and H, and the various oxides and silicates used in them vaporize to a certain extent. Therefore, the arc is surrounded by a zone of nonoxidizing gases. Lastly, the oxides and silicates unite to form a protective layer of liquid slag over the freshly deposited metal.

Numerous materials are used in electrode coatings, including various oxides and silicates of titanium, zirconium, silicon, magnesium, calcium, aluminum, iron, manganese, sodium and potassium. Aside from their functions in forming gases and slag, certain ingredients are sometimes present to produce the desired arc characteristics or to adapt the coating to manufacturing purposes. Clay, asbestos, lime, etc. are typical slag-forming ingredients. As binders, water glass (sodium or potassium silicate), and in some cases certain gums, glues and lacquers are employed.

In addition, the coatings often contain various organic materials, especially cellulose in the form of wood flour, pulp, paper or cotton. In some cases they are used as wrappings, impregnated with the inorganic constituents of the coating. Their chief function, however, is to produce an atmosphere of CO and H around the arc. Some carbonates such as powdered marble or limestone, sodium carbonate, etc., are sometimes used, and give off $CO_2$ which breaks down to O and CO. Water of crystallation in some of the minerals evolves H and O, and as already mentioned, most of the silicates and oxides vaporize somewhat and add to the volume of gases surrounding the arc.

In addition to the slag-forming and gas forming constituents of coatings, one or more ferroalloys are commonly added to the mixture, to act as deoxidizers and reduce any iron oxide that may be formed and absorbed by the deposited metal. Those generally used are ferromanganese, ferrosilicon or ferrotitanium. Certain of these alloys react in some way with water glass solutions to form gases which create bubbles in the freshly applied coatings. It is generally necessary, therefore, to use powdered alloys that have been specially treated so that they do not react in this manner.

### Methods of Coating

Woven sleeves or spiral windings of asbestos or cotton fabric, impregnated with the other materials, may be used to form coatings, but in the majority of cases they are applied either by repeatedly dipping the electrodes in a slurry composed of the several materials, or by extruding a thicker paste in special machines that force the wire and the coating through dies. For light coatings, a single dip will suffice, but to produce thicker layers it is necessary to repeat the dipping several times, drying each layer before the next one is applied. It is not possible to produce heavy coatings at one dip.

At one end of the electrode, the coating is removed for about an inch to provide electrical contact with the clamps, and the opposite end is wiped clean so that the current will flow immediately when the arc is struck by touching the electrode to the work. In certain lengths of electrode, the clamping space is in the middle instead of at one end.

The core wire of the electrode is generally made from low-carbon, open-hearth steel, and should have a


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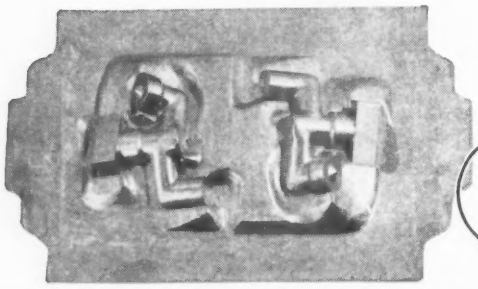

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bright clean finish, free from films of oil or remnants of wire-drawing compounds which interfere with proper adhesion of the coating. Modern specifications place no limitations on the chemical composition of the wire, but impose definite limits on the mechanical properties of the deposited metal. As a rule, however, the phosphorus and sulphur are quite low.

In the joint specifications of the American Welding Society and the American Society for Testing Materials, the diameter of the core wire is restricted to a maximum variation of plus or minus 0.002-in. from desired diameter, and the lengths of the individual electrodes are held to a variation of plus or minus ¼-in. The covering "must be concentric to the extent that the maximum core-plus-one covering dimension shall not exceed the minimum core-plus-one-covering dimension by more than 3 per cent". Standard diameters and lengths of electrodes are shown in Table I.

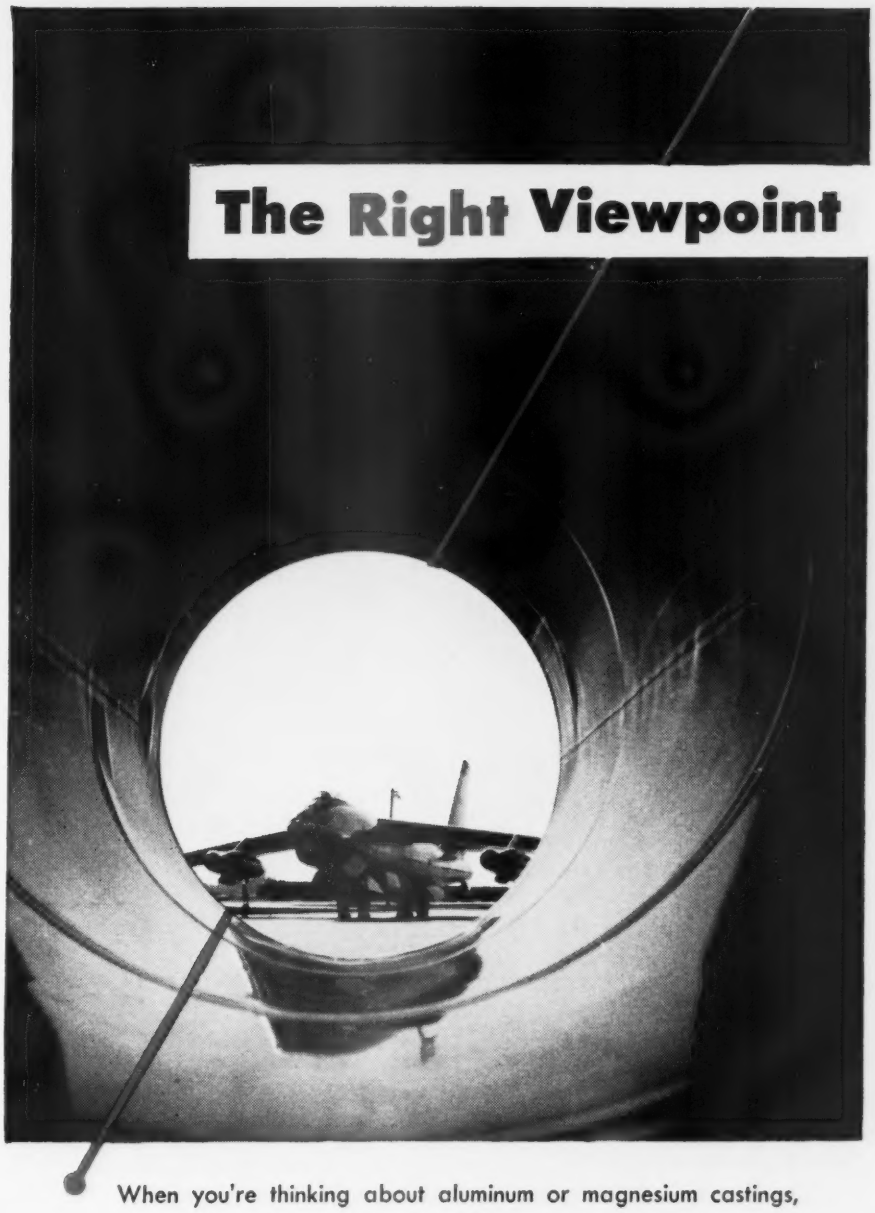
In the joint ASTM-AWS specifications, light-coated and covered electrodes for welding mild steels are classified according to the types of coating used, the current for which they are suitable, and the welding positions to which they are adaptable. A numbering system is followed in these specifications in which the prefix *E* applies to all types, the first two or three figures specify the tensile strength of the deposited weld metal, and the last two figures refer to the type of coating used. In the tensile strength code numbers, the "60", for instance, refers to strengths between 60,000 and 69,000 psi, "70" to those from 70,000 to 79,000 psi, etc. Table II lists the several classes.

The tensile strength of the deposited metal is determined by means of standard 2-in.-diam test specimens cut from all-weld-metal deposits, made under carefully controlled conditions, the details of which are described in the specifications. The type of layers to be deposited are as shown in Fig. 11, and the thickness of the test plates to be used are as follows:

| Electrode Size, In. | Plate Thickness, In. | Backing Plate Thickness, In. |
|---|---|---|
| 5/32 | 3/4 | 1/4 |
| 1/8 | 3/4 | 1/4 |
| 1/4 | 1 | 1/2 |
| 5/16 | 1 1/4 | 1/2 |

The mechanical properties of the deposited metal in the as-welded state are specified as shown in Table III.

In addition to the all-weld-metal tensile tests, the specifications prescribe methods of demonstrating the *usability* of the different electrodes, for the types of current and the welding positions for which they are intended. These consist of bend tests of welds joining two pieces of plate,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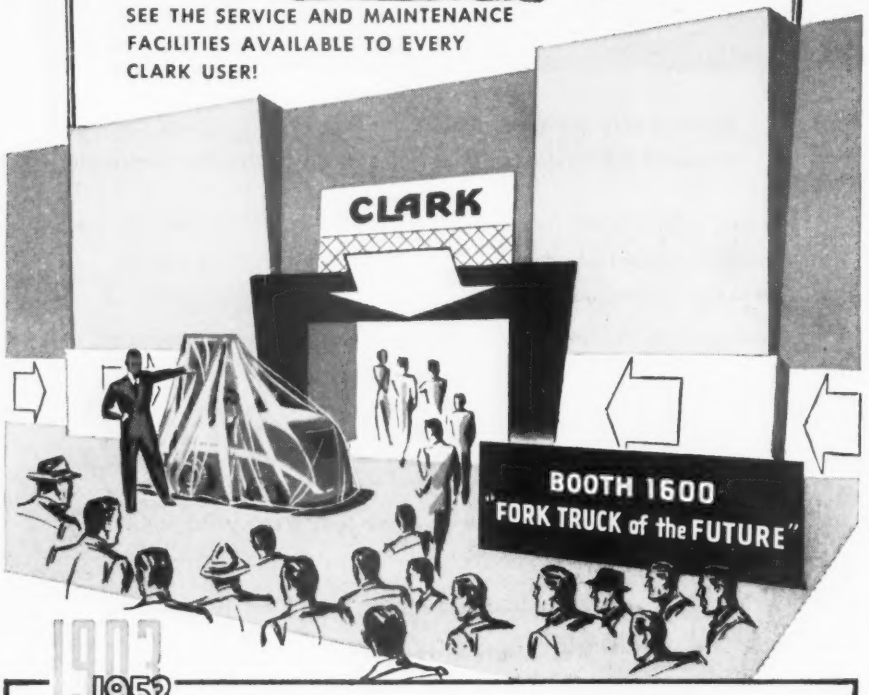


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as shown in Fig. 12, and of the examination of the cross-sections of fillets welds as shown in Fig. 13.

These test pieces are made in each of the possible welding positions, and with the type of current for which the electrodes are to be used. The bend tests are to demonstrate the strength of the bond between weld deposit and base metal. The fillet weld is cross sectioned and polished, and must show the weld to have penetrated to or beyond the junction of the plate edges, and to be entirely free from cracks, and reasonably free from undercutting[5], overlap[6], trapped slag and porosity. In addition, the low-hydrogen types are tested to demonstrate the amount of hydrogen evolved from a single bead of weld metal 4½ in. in length. These various tests generally are made by the manufacturers of the electrodes, for purposes of classification, and the electrodes are sold under a guarantee that they will exhibit the prescribed characteristics.

### Designations Are Listed

For welding low-alloy steels, the ASTM-AWS specifications list electrodes giving weld deposits with tensile strengths of 70,000, 80,000, 90,000, and 100,000 psi, with coatings of the 10, 11, 13, 15, 16, 20, and 30 classes. These are numbered, for instance, E 7011, E 9020, etc. The bend test is called for on only the 70,000 class, the fillet weld test for all. For convenience in referring to the several other classes, the symbols XX are used in place of the first two or three numbers of the symbol; for instance, E XX10 for the E 6010, E 7010, E 8010, etc. Thus one is able to refer to all of the rods with class 10 coatings as a group. For reasons already mentioned, electrodes of the 4510 and 4520 types are seldom if ever used in welding operations on steel castings.

The E XX10 and E XX11 types are extensively used in structural welding, but are no longer used to any great extent to weld steel castings. They handle well, their slag is easily removed hot, but their deposition rates are somewhat lower than those of the other classes. Though the E XX10 type is suited only to dc current, the E XX11 electrodes may be used on either ac or dc. When solid the ductility of the weld deposits made with them is good, but the large quantity of hydrogen evolved by the cellulose they contain has a harmful effect on the quality of the welds as a whole.

For readily welded cast steels, containing not over 0.30 per cent C, the E 6012 and E 6013 or E 7013 electrodes are very widely used. They

(*Continued on page 254*)

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Extreme accuracy in every detail backed up by top notch service

*Write for Bulletin*

*The* SCIENTIFIC CAST PRODUCTS *Corp.*

1390 East 40th Street
CLEVELAND 3, OHIO

2520 West Lake Street
CHICAGO 12, ILLINOIS


*(Continued from page 252)*

are suitable for either ac or dc circuits and have a high deposition rate. Containing some cellulose, they evolve hydrogen, though not as much as the E XX10 and E XX11 classes do. Aside from this, their chief disadvantages are that they produce slags that are rather hard to remove when hot, and weld deposits are a little lower in elongation than those provided by other types.

The so-called "hot" rods, E XX20 and E XX30, produce such fluid slags that they are usable only for flat or horizontal position welding. The E XX20 type can operate at high currents that result in deep penetration, and hence is used extensively in deep fillet welding in structural work. The E XX30 type is similar, but has a less fluid and less voluminous slag, and is designed for welding in deep grooves. Neither the E XX20 nor the E XX30 type evolves any appreciable amount of gas; they depend upon the slag to protect the deposited metal from oxidation.

As an additional precaution against the absorption of undue amounts of iron oxide in the deposited metal, ferromanganese is incorporated in the coating, to serve as a deoxidizer. High amperage can be used with these electrodes, so that the metal can be laid down rapidly. For welding most types of plain carbon cast steel, especially when the work can be done down-hand, these electrodes are quite satisfactory.

### Are Low in Hydrogen

The low-hydrogen types of coating, E XX15 and E XX16, are a comparatively recent development. They originally were intended for welding low-alloy steels, which for reasons that will be discussed later, are hard to handle successfully with electrodes that evolve hydrogen. The E XX15 type is suitable only for dc circuits, the E XX16 electrodes may be used on either ac or dc current. In both types, the coatings are entirely free from organic materials, and contain only carbonates, silicates and oxides of lime, sodium, etc.

In the process of manufacture they are heated to about 900° F, which drives off the water of crystallization in any of the materials they contain, and reduces their total moisture content to below 0.50 per cent. Therefore they evolve practically no H, but form a protective gas layer around the arc, composed of CO and O resulting from the decomposition of $CO_2$ given off by their carbonate content.

If they are to evolve no hydrogen, these electrodes must not be allowed to absorb moisture from the air, and therefore are generally shipped in moisture-vapor-proofed packages.


®FOSECO

Points the way to the...

EASY

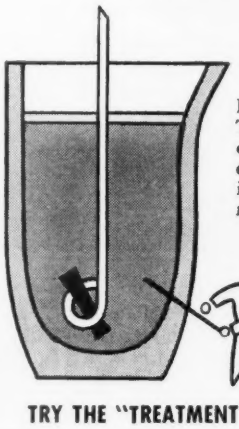
EFFICIENT

ECONOMICAL

...method of deoxidizing non-ferrous alloys WITH THE EXCLUSIVE

de-ox-tube TRADE MARK REG. U.S. PAT. OFF.

* Reduces metallic oxides
* Increases fluidity — reduces misruns
* No loss or waste of material
* Reaction takes place within the melt
* Provides uniform deoxidation
* Control is easy and accurate
* Improves mechanical properties



HERE'S HOW IT WORKS

Plunge a De-Ox-Tube to the bottom of the melt. The copper tube melts into the alloy and releases FOSECO'S deoxidant for the particular alloy being treated. No contaminating elements introduced.

TRY THE "TREATMENT IN THE TUBE"

There's a FOSECO De-Ox-Tube for almost every non-ferrous alloy. They help you produce clean, sound, pressure-tight castings. Pre-measured sizes contain the proper deoxidant for the weight and type of alloy being melted. No time lost in weighing or measuring.

WRITE TODAY

for the FOSECO chart that helps you select the right De-Ox-Tube for your requirements. No obligation on your part. If you have a special problem, tell us about it — we'll be glad to be of help.

FOUNDRY SERVICES, Inc.
280 Madison Ave., Dept. F
New York 16, N. Y.

However, this protection is not entirely effective since in damp weather the coatings on the electrodes not actually in use after the packages have been opened, readily absorb moisture from the air. As a result, if they are used after several hours' exposure, they will evolve some hydrogen by the vaporization and dissociation of absorbed moisture.

To be certain of obtaining the advantages of not evolving hydrogen, therefore, it is best to provide a heated storage chamber close to the place where these electrodes are used, in which they are placed as soon as the package has been opened, and kept until used. If for any reason they have been allowed to absorb moisture, they must be heated to temperatures recommended by the manufacturers; generally over 300° F. At least one manufacturer now supplies electrically heated ovens for storing electrodes in batches of from 350 to 900 lb, and smaller portable containers holding 12 lb, that can be plugged into any convenient source of current. The larger ovens are provided with thermostatic control that enables them to be used either for storing freshly opened electrodes or for drying those that have absorbed moisture, at suitable higher temperatures.

### Hold Shorter Arc

In using low-hydrogen electrodes a shorter arc must be held than with those of other types to minimize absorption of gases by the weld metal, and to keep the comparatively heavy slags freely molten. The rate of deposition is somewhat lower than that of other types though by using higher current the rate can be increased. Penetration is not as great as with other electrodes, and the groove preparation must in some cases be modified to allow for this.

For welding ordinary low or medium carbon cast steels which are not as much affected by the presence of hydrogen in the arc as high-carbon and low-alloy steels, low-hydrogen electrodes have not yet been widely adopted. However, when their advantages are better understood, they will probably be used for all but the most readily welded cast steels.

With the short arc required in using low-hydrogen electrodes, alloys and even carbon incorporated in the coating material can be added to the weld deposit with less loss than when longer arcs are used. The composition of the weld deposit, therefore, can be more readily varied to give it the desired mechanical properties, than in using other types of electrodes.

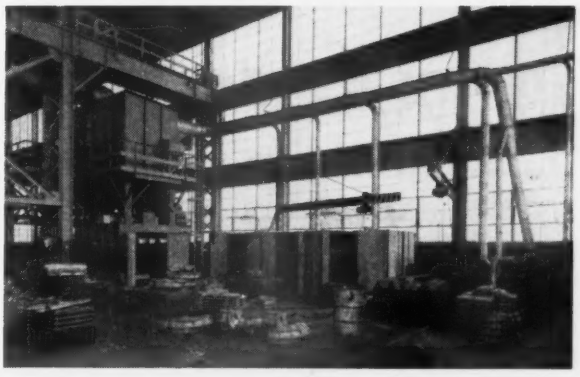
**Welding Procedure**—In making a weld, the operator strikes an arc by touching the end of the electrode to the work, and quickly withdrawing it a short distance. He then holds it slanting away from him at a slight angle to the vertical as shown in Fig. 9 (March issue). To allow time for the escape of gas and for the slag particles to rise to the surface of the deposit, the pool of metal is kept liquid by what is known as "puddling". To do this, the electrode is not moved steadily forward, but stopped at short intervals so that the arc is trained successively upon a number of points fairly close together.

In filling up a shallow depression in a casting, such as is left when a single spot of sand or a blow-hole is chipped or burned out, the welder may be able to deposit enough metal without moving the electrode. Commonly, however, the areas being repaired are too large to be filled in this way, and the deposit must be built up of one or more "beads" produced by moving the electrode laterally over the piece. If it is moved in a straight path, as shown in Fig. 14, what is called a "string" bead is formed. Actually, this consists of a


SLY PIONEERS & LEADERS

INDUSTRIAL DUST CONTROL

*Widely Used... Not Expensive*



Sly Dust Filter mounted over Sly Blast Room

You, too, may have a dust problem as did this foundry before the installation of Sly Dust Control.

Note how clean the foundry is now . . . a good place to work — *efficiently.* Men like the better working conditions and produce more.

The Sly Dust Filter (shown at left) handles the dust created by a Sly Blast Room, grinder booths, and surface grinders. *The cleaned air contains no visible dust.*

In these days of "*forced draft*" production, equipment which helps increase production is worth looking into. Sly is *not* expensive as thousands of installations prove.

Ask for Bulletin 98 and tell us your problems so that we can make suggestions.

THE W. W. SLY MANUFACTURING CO.
4753 TRAIN AVENUE • CLEVELAND 2, OHIO
*BRANCHES IN:*
NEW YORK • CHICAGO • PHILADELPHIA • SYRACUSE • DETROIT • BUFFALO
CINCINNATI • ST. LOUIS • MINNEAPOLIS • BIRMINGHAM • LOS ANGELES • TORONTO

# SEMET-SOLVAY FOUNDRY COKE

**PRACTICAL** SEMET-SOLVAY metallurgists are practical foundrymen who are always glad to help with your melting problems. Their services go along with the use of Semet-Solvay Foundry Coke.

**SEMET-SOLVAY DIVISION**
Allied Chemical & Dye Corporation

CINCINNATI · DETROIT
BUFFALO · CLEVELAND

*In Canada:* SEMET-SOLVAY COMPANY, LTD., TORONTO

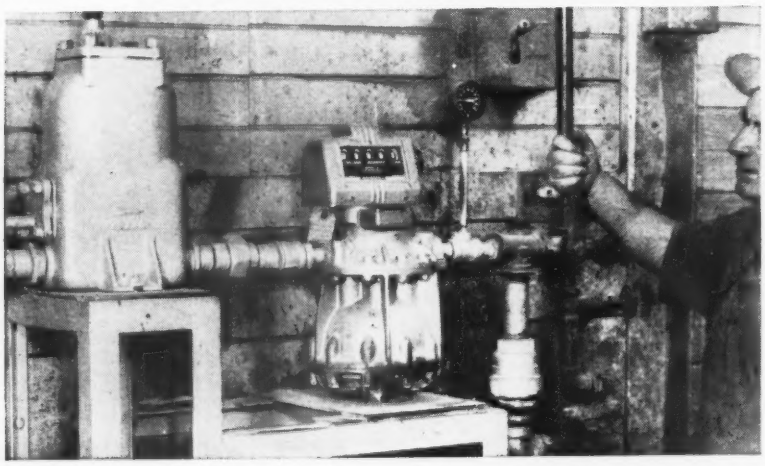
*for Better Melting*



BOWSER

# XACTO METER

## . . . for uniform core hardness!



**This Bowser metering system is accurately measuring core oil into the sand muller. Another Bowser meter makes sure that the exact quantity of water is used.**

**Together these meters assure uniform core hardness . . . reduce rejects, save core oil and hours of labor.**

***Write today for complete information.***

BOWSER

**BOWSER, INC., 1376 Creighton Ave., Fort Wayne 2, Ind.**

REGIONAL OFFICES: ATLANTA · CHICAGO · CLEVELAND · DALLAS
KANSAS CITY · NEW YORK · SAN FRANCISCO · WASHINGTON,
D. C. · CANADIAN PLANT AND SALES, HAMILTON, ONT.


series of small masses of metal, each overlapping the one previously formed, and integrally united with it, so that the bead has a smoothly rippled surface.

A slightly wider deposit is formed when the electrode is moved from side to side as well as laterally, producing a "weave" bead, such as is shown in Fig. 15. There are many modifications of the weaving technique, in which the electrode is moved in a figure eight, ellipse or other path as it is traversed over the piece. A narrow, shallow groove may be filled with a single layer of metal laid down as a string or weave bead. Wider shallow ones require several beads laid side by side and overlaping each other. When the area to be filled up is both deep and wide, the deposit must be formed of several layers of beads, each superimposed upon the one below it.

The welder usually starts a bead at one end of the space to be filled and moves the electrode toward him, or from one side to the other, traversing it at such a rate that the deposited metal is well united to the casting, and adequately puddled. As each electrode is used up, a new one is started at the point where a "crater" was formed by the rapid breaking of the arc. At the end of the final bead, the crater is filled by breaking and re-forming the arc several times, thus depositing additional metal at this point.

After each bead is finished, it is tapped with a hammer and wire-brushed to knock off any adhering slag, so that no nonmetallic material will be trapped in the next layer deposited. Welds are usually built up until their upper surface is a little above that of the casting, and the extra thickness is chipped or ground down level.

*(To be concluded next month)*

**References**

5. "Undercutting" is failure of the weld deposit to fill out the groove at the sides.
6. "Overlap" is the reverse, the weld deposit overlying the base metal at the sides, without penetration.

## Book Review

*Machine Shop Tooling,* by Charles C. Williams, paper, 344 pages, 4½ x 6½ in., published by the Wilco Press, Philadelphia. Price $3.

Designed expressly for the man at the machine, this volume is alphabetized like a dictionary for quick reference. It gives specific recommendations for drills, taps, milling cutters, grinding wheels, threaders, turning tools, special threads, etc., for all materials. A quick reference section on "Troubles" lists the causes of most machine tool and material problems and their solutions. Unusual and hard-to-find data are included.

## ..TRADE PUBLICATIONS..

For More Details Use Reply Card—Page 225

METAL PROCESSING: General Electric Co., Schenectady 5, N. Y. —Bulletin GEA-5797 employs photographs and diagrams to explain how to cut down overall costs and shorten cycles during annealing of malleable iron. It discusses the effects of temperature and analysis on the annealing cycle and describes types of furnaces that can be used in the process. Bulletin GEA-5912 describes solution heat-treating, annealing, aging and stabilizing of aluminum. Sections deal with the heat-treating process, heat-treating equipment and the selection of furnaces.

For More Details Circle No. 96—Page 225

SLING CHAINS: McKay Co., 326 McKay Bldg., Pittsburgh 22—Chart designed to make sling chain selection easier identifies various types of sling chains and the different attachments that can be used on single, double, triple and multiple slings for lifting any given load. Punched copies for notebook use and grommeted cardboard copies for hanging are available.

For More Details Circle No. 97—Page 225

METALLIC LUBRICANT: Imperial Oil & Grease Co., 6399 Wilshire Blvd., Los Angeles 48—Bulletin describes lubricant made in grease and oil forms which employs petroleum as a vehicle instead of as the primary lubricating agent. Homogenized, micron-sized particles of self-lubricating metallic solids, such as molybdenum disulphide, are added to hydrocarbon base stock.

For More Details Circle No. 98—Page 225

SAND ADDITIVES: Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5—Bulletin discusses the use of sand additives and provides full information about the firm's sea-coal, bond and stabilizer additives for control of carbon content, variation of green and dry strength and control of flowability. Analyses of the products and instructions as to their use are included.

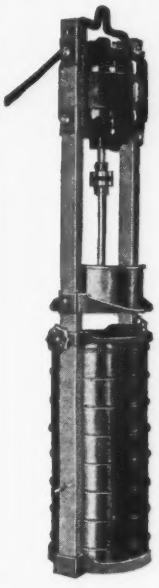
For More Details Circle No. 99—Page 225

FERROALLOYS: Vanadium Corp. of America, 420 Lexington Ave., New York 17—Folder provides general information about the company's three intensifying ferroalloys, tells what they do, describes their compositions, and suggests methods of adding them to the melt. These alloys are used in products made by all steel-making methods.

For More Details Circle No. 100—Page 225

DAMPERS: Minneapolis - Honeywell Regulator Co., Brown Instruments Division, Station 213, Wayne & Windrim Aves., Philadelphia 44—Catalog 8502 describes louver, round, mixing, outlet and fire dampers for regulation of air flow in industrial applications. It also covers electric, pneumatic and manual damper operators and includes application data,


# COMBS FOUNDRY RIDDLES



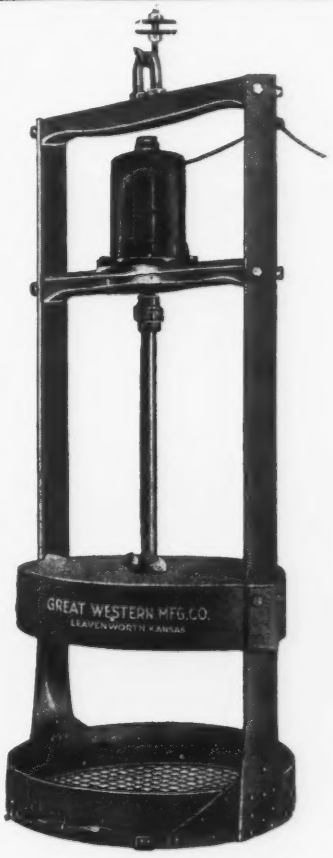
Type "HL" Lab Sifter for sand control $202.00 without sieves

**Save You DOUBLE the Purchase Price The First Week You Use Them***

** They do the work of 20 men for only 1¢ per hour. You save over $150.00 in wages a day!*

WORLD FAMOUS!

Type "CS" with 24" square screen and automatic discharge $320.00




Type "CR" with 24" sieve $310.00

Type "V"
With 20" sieve ..... $250.00
Also made with 36" sieve $450.00

All these machines cost less than 1¢ an hour for power. Quickly removable steel rim sieves can be removed, emptied and replaced in seconds. Saves up to 97% of your labor costs. Send for free descriptive folder.

*Prompt Delivery From Your Foundry Supply House*

**GREAT WESTERN MFG. CO.**

**Leavenworth — Kansas**

## Eliminate 70% to 90% of Conveyor Downtime

Cedarapids Schrock Built by IOWA

**MOTORIZED HEAD PULLEYS**

eliminate maintenance on chains, belts, sprockets, Universal drives, countershafts, etc.

### *EVERYTHING is contained INSIDE the pulley shell!*

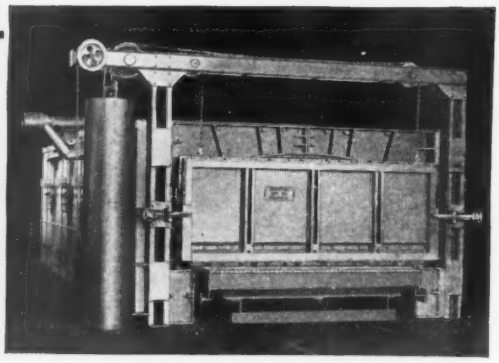
HERE'S a money-saving departure from conventional conveyor drives. A Cedarapids-Schrock *Motorized* Head Pulley is simply a new application of the long-proven gear reduction drive, with everything . . . electric motor, reduction gears and all moving parts . . . contained inside the drum, completely protected from grit, dirt and weather and with no outside parts or motors to service. 70% to 90% of conveyor trouble and downtime is saved by eliminating the exposed parts necessary with conventional pulley drives. In operation, the pulley shell rotates about the electric motor which is held stationary by a torque arm attached to the conveyor frame. The speed of the shell depends on the combined reduction ratio of the pinions and gears inside the shell. Compact, easy-to-install, job-proved Motorized Head Pulleys are available in sizes from 5 to 30 HP and in various widths.

Find out all the advantages of converting your belt conveyor or belt-bucket elevator installations to *motorized* efficiency before you need head pulley replacements. See your distributor today, or write for Bulletin MP-1.

**IOWA MANUFACTURING COMPANY**
Cedar Rapids, Iowa, U. S. A.

*Built for sale in Arizona, California, Nevada, New Mexico, Southern Oregon, Southwestern Utah and Texas by*
**YUBA MANUFACTURING CO.**
(Pulley and Sprocket Department)
Benica, Calif.

FOR NORMALIZING ANNEALING AND ALL HEAT TREATMENT OF CASTINGS



## JOHNSTON CAR BOTTOM FURNACES

You'll get clean heating, high efficiency, and fuel economy in the Johnston furnaces. Engineering experience is also apparent in their smooth mechanical operation—in their roller bearings in car and door hoist shafts, and power operated car pullers. Write today for bulletin F-240.

JOHNSTON EQUIPMENT FOR THE FOUNDRY
• MELTING FURNACES • HEATING TORCHES • LADLE HEATERS
• HEAT TREATING FURNACES • BURNERS, BLOWERS, CONTROLLERS
OVER THIRTY YEARS EXPERIENCE IN DESIGN AND MANUFACTURE.

THE JOHNSTON LINE SAFETY & DEPENDABILITY
**JOHNSTON** MANUFACTURING CO.
2825 EAST HENNEPIN AVE.
MINNEAPOLIS 13, MINN.
ENGINEERS & MANUFACTURERS OF INDUSTRIAL HEATING EQUIPMENT


velocity-pressure drop charts and damper ratings for electric and pneumatic operators.
For More Details Circle No. 101—Page 225

FIRE CLAYS: Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago 6—Folder discusses essential properties of fire clays in general and specifically the company's three Ohio clays. Selection and preparation of fire clays for use is discussed, and material pertaining to other foundry products made by the company is included.
For More Details Circle No. 102—Page 225

LEVEL CONTROLS: Fielden Instrument Division, Robertshaw-Fulton Controls Co., 2920 North Fourth St., Philadelphia 33—Bulletin F-101 describes an electronic level control for liquids or free flowing solids. The bulletin outlines applications, stresses outstanding features and lists the probe electrodes available for various installations.
For More Details Circle No. 103—Page 225

AUTOMATIC POURING UNIT: Ajax Engineering Corp., Trenton 7, N. J.—Folder describes the characteristics and operation of a combination induction holding furnace and pumping unit for use in die casting of aluminum and zinc alloys. Illustrations show the control cabinet, an installation diagram and the unit in operation.
For More Details Circle No. 104—Page 225

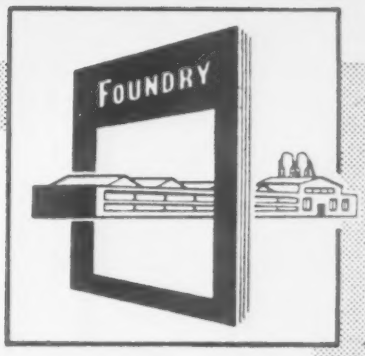
CASTING ALLOYS: Cannon-Muskegon Corp., P. O. Box 506, 2875 Lincoln St., Muskegon, Mich.—Brochure describes stainless, "super" stainless and alloyed tool steels developed for remelting and use by investment casting foundries. The brochure illustrates a new plant, designed and built for producing alloys in shot and ingot form.
For More Details Circle No. 105—Page 225

LOCOMOTIVE CRANES: Orton Crane & Shovel Co., 608 South Dearborn St., Chicago 5—Catalog 84 explains the features of the torque control unit used in the firm's cranes. Complete clearance dimensions, weights of rehandling clamshell buckets and rated lifting capacities of standard-gage eight-wheel locomotive cranes are included.
For More Details Circle No. 106—Page 225

FUME CONTROL: R. Lavin & Sons, 3426 South Kedzie Ave., Chicago 23—Vol. 8, No. 4 of *The Lavingot*, the firm's periodical, contains an article on control of fumes from melting brass, written by William George, company metallurgist and foundry engineer. Company's new zinc fume collector is described and illustrated.
For More Details Circle No. 107—Page 225

AIR PURIFIERS: Purifier Division, V. D. Anderson Co., 1935 West 96th St., Cleveland 2—Bulletin 700 discusses the uses of purifiers for removing dirt and moisture from compressed air and other gases. Des-

(*Continued on page 261*)

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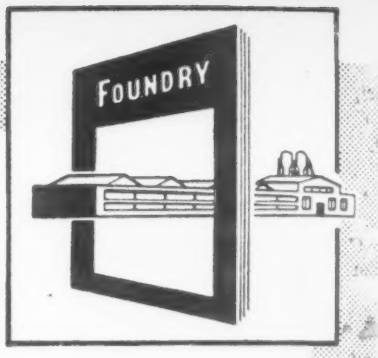


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Our staff will forward this information to the advertiser immediately so you'll be relieved of the necessity of writing several letters. You'll hear from the advertiser directly, answering your request.

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**Penton Building**
**Cleveland 13, Ohio**

*Readers Service Dept.*

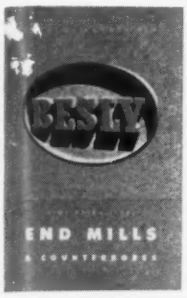
**FOUNDRY**
**Readers Service**

(*Continued from page* 258)

cations of purifier installations in different applications are accompanied by cutaway views. Types of entrainment likely to be found in various vapors and gases are listed.

For More Details Circle No. 108—Page 225

CUTTING TOOLS: Besly-Welles Corp., Beloit, Wis.—Catalog illustrates and describes a new line of high-speed end mills and counterbores, including single and double end mills, ball end mills, holders, plain and adjustable hollow mills, tapers and straight shank counterbores. These tools complete the company's line of drills, reamers and taps, which was undergoing development during 1951 and 1952.




For More Details Circle No. 109—Page 225

STEEL BUILDINGS: Soule Steel Co., 1750 Army St., San Francisco 24—Two-color, 24-page brochure describes the company's steel buildings, for use as machine shops, foundries and warehouses. Detailed drawings, charts, photographs and descriptive material explain design, construction and function of the clear-span, rigid-frame, factory-produced structures.

For More Details Circle No. 110—Page 225

METALLIZING: Wall - Colmonoy Corp., 19345 John R St., Detroit 3—Bulletin describes and illustrates latest developments in the organization's equipment and techniques for fusion bonding hard facing alloys to metal parts. Properties of three alloys are given which are adaptable to the process and have Rockwell C hardnesses ranging from 35 to 61.

For More Details Circle No. 111—Page 225

MAGNETIC EQUIPMENT: Dings Magnetic Separator Co., 4740 West Electric Ave., Milwaukee 14—Catalog C-5000-B covers applications of magnetic separation; removing iron from materials carried on conveyer belts, in chutes and ducts and from wet materials; magnetic concentration and purification; heavy media recovery and magnetic materials handling.

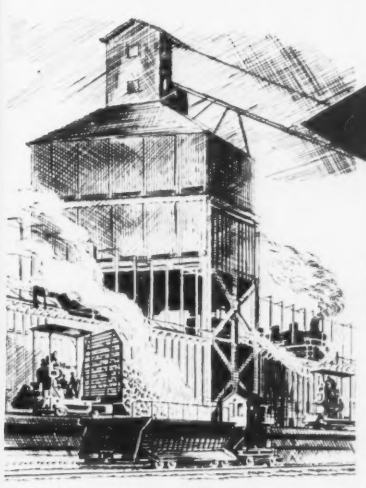
For More Details Circle No. 112—Page 225

RUBBERIZED ABRASIVES: Cratex Mfg. Co., 81 Natoma St., San Francisco 5—Catalog 53 contains material about the use in burring, smoothing and polishing operations of rubberized abrasives in the form of wheels, points, blocks, sticks and cones, for machine or manual applications. Specifications and prices are included.

For More Details Circle No. 113—Page 225

FERROUS CASTINGS: Detroit Gray Iron Foundry Co., 282 Iron St., Detroit 7—Illustrated brochure explains the company's expanded ferrous castings services, describes the


# Another Modern



ABC

# Battery

## Helps Supply Growing Demand

# for ABC FOUNDRY COKE

Year by year demand for uniformly prepared and properly sized ABC foundry coke has been mounting steadily. Today our Company produces more commercial foundry coke than any other single plant in the U. S. A. To help insure an ample supply of our quality coke for the Nation's malleable and grey iron foundry industry, we have enlarged and further modernized our extensive plant facilities.

**In 1950 we renewed a battery.**
**In 1951 we built a new battery.**
**In 1952-53 we rebuilt another battery, which is now in operation.**

**Our capacity is now over 900,000 tons of coke a year.**

*A DEPENDABLE SOURCE OF SUPPLY*

Unlike most other coke oven plants, we have no blast furnace or utility affiliations having first call on our production during periods of peak demand.

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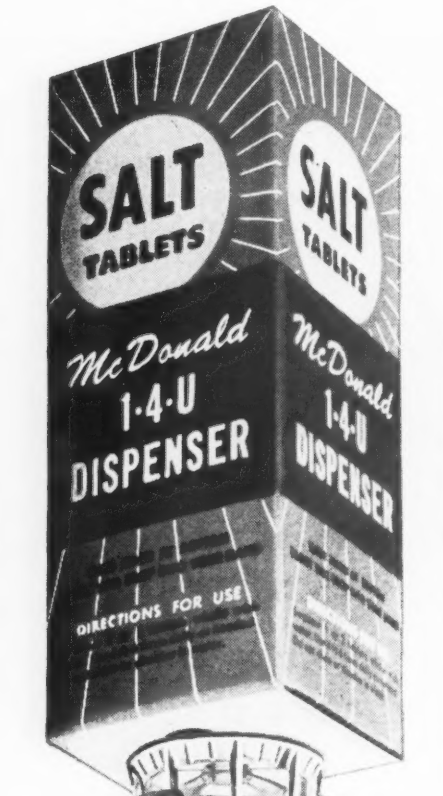


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recent addition of subsidiaries at Lansing and Rochester, Mich., and includes formulas for estimating weights of castings and tables showing the physical properties and chemical ranges of the firm's standard alloyed cast irons.

For More Details Circle No. 114—Page 225

WIRE SLINGS: A. Leschen & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12—Wire rope slings and fittings handbook contains over 100 illustrations showing standard wire rope slings, grommet slings and multiple part slings. Charts show how to calculate sizes of slings required for given jobs and also list correct sling angles in relation to loads.

For More Details Circle No. 115—Page 225

HORIZONTAL BAND SAWS: Wells Mfg. Corp., Three Rivers, Mich.—Catalog G-52 presents data concerning the organization's complete line of horizontal, metal-cutting band saw machines and heavy-duty saws for unusual cutoff jobs. A reference chart shows proper selection of blade, feed and speed for cutting different types and sizes of materials.

For More Details Circle No. 116—Page 225

COLLOIDAL GRAPHITE: Acheson Colloids Co., Division of Acheson Industries Inc., Port Huron, Mich.—Illustrated bulletin 423 describes how the firm's colloidal graphite has been used successfully to lubricate kiln cars at 450°F, oven conveyors at up to 1200°F and forging dies at over 2000°F.

For More Details Circle No. 117—Page 225

DUST CONTROL: Claude B. Schneible Co., Sales Dept. 2, P. O. Box 81, North End Station, Detroit 2—Bulletin 1152 is the latest edition of the company's catalog of its complete line of dust control equipment for foundries. Includes latest information, installation pictures and diagrams.

For More Details Circle No. 118—Page 225

TEMPERATURE CONTROL: Tempil Corp., 11 West 25th St., New York 10—Bulletin explains the nature, applications, and types of temperature sensitive tablets manufactured by the company. Instructions as to their use and a table of temperature ratings in which they are available are included.

For More Details Circle No. 119—Page 225

FLOOR RESURFACING: Monroe Co., 10703 Quebec Ave., Cleveland 6—Bulletin 62-B describes the prismatic, crystalline mineral recently added to the company's floor resurfacing and repair material and said to form a hard, resilient, nonskid floor surface.

For More Details Circle No. 120—Page 225

METALLIZING: Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y.—Bulletin 51A covers a wide range of practical applications of metallizing in machine element maintenance and repair, production, salvage and corrosion prevention. It discusses characteristics of sprayed metal, describes in general


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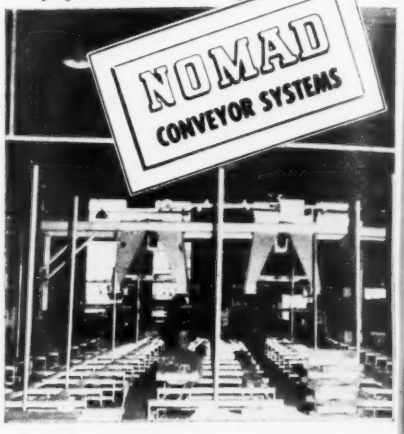

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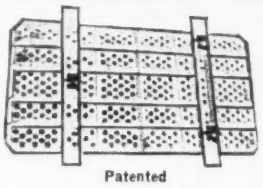

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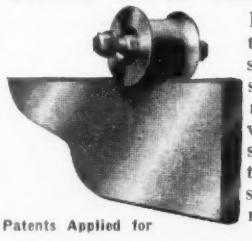

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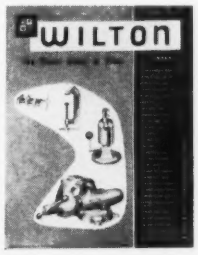
where the process is used and points out its general advantages and limitations.

For More Details Circle No. 121—Page 225

V-BELT BULLETIN: Allis-Chalmers Mfg. Co., 1032 South 70th St., Milwaukee—Bulletin 20B7786 deals with high capacity V-belts recommended for use in tight spots and for compactness, changed peak loads, resisting oil, weather and chemicals, and where static is a factor in operation.

For More Details Circle No. 122—Page 225

CLAMPING TOOLS: Wilton Tool Mfg. Co., 925-41 Wrightwood Ave., Chicago 14—General catalog 109, completely revised from cover to cover and listing several new products, contains federal specification references and technical data pertaining to vises, clamps, work positioners and other hand clamping tools. Over 100 illustrations of these devices are included in the publication.




For More Details Circle No. 123—Page 225

ARC WELDING: Westinghouse Electric Corp., Box 2099, Pittsburgh 30—Booklet B-5451 describes arc-welding accessories varying from electrode holders and ground clamps to protective clothing and headgear. All are illustrated and accompanied by specification data.

For More Details Circle No. 124—Page 225

VALVES: Ledeen Mfg. Co., 1600 South San Pedro St., Los Angeles 15—Bulletin 1000 includes illustrations, operating and circuit diagrams and dimensions and weights for the firm's complete line of valves for operating air and hydraulic cylinders, and air motors.

For More Details Circle No. 125—Page 225

PLANT LOCATION: Fantus Factory Locating Service, Empire State Building, New York 1 and 139 North Clark St., Chicago 2—Booklet analyzes the scientific approach to plant location and explains the background and experience of the firm in such work.

For More Details Circle No. 126—Page 225

SALT POT FURNACES: Eclipse Fuel Engineering Co., 1002 Buchanan St., Rockford, Ill—Bulletin D-50 describes the company's line of pot furnaces for hardening and drawing in lead and heat treating salts. Operation and special features are explained and illustrated. Dimensions and specifications are included.

For More Details Circle No. 127—Page 225

CUPOLA FUMES: American Wheelabrator & Equipment Co., 1102 South Byrkit St., Mishawaka, Ind.—Bulletin 352 describes an installation of the company's cupola fume collection system. The cloth-tube-type collector is designed for con-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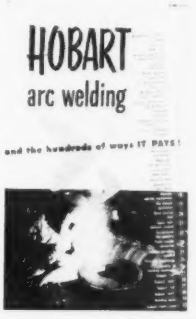
tinuous and automatic operation. Coolers make cloth filtration possible despite high temperatures which characterize the application.

For More Details Circle No. 128—Page 225

PIG IRON: Pig Iron Division, Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh 19—Booklet describes the location and operation of the corporation's Neville Island, Pa., blast furnace and discusses the merchant pig iron it produces, in foundry, malleable, basic and bessemer iron grades.

For More Details Circle No. 129—Page 225

ARC WELDING: Hobart Brothers Co., Troy, O.—Booklet contains over 100 photographs pointing out how arc welding is used profitably for production, maintenance and repair in 18 different industries, including metalworking, construction, agriculture and others. A portion of the volume is devoted to the features of the company's line of arc welders, electrodes and accessories.




For More Details Circle No. 130—Page 225

ELECTRIC HEAT: Edwin L. Wiegand Co., 7300 Thomas Blvd., Pittsburgh 8—Issue 49 of *Chromalox News* reports on uses of electric heating equipment such as electric radiant ovens, electric circulation heaters, nozzle heaters, a pneumatic press with a heat reservoir, strip heaters and other types.

For More Details Circle No. 131—Page 225

PLATE MAGNET SEPARATORS: Eriez Mfg. Co., Erie, Pa.—Brochure B-603 on low cost, permanent, non-electric plate magnets applicable to all but the heaviest tramp iron removal problems contains engineering drawings and photographs of typical installations.

For More Details Circle No. 132—Page 225

TUBE SYSTEMS: Lamson Corp., Syracuse 1, N. Y.—Booklet entitled "On Target" pictures and describes many uses for the firm's pneumatic tube systems for handling paper work. Basic operation, case histories, technical data and full information on carrier types and dimensions are detailed.

For More Details Circle No. 133—Page 225

INDUSTRIAL ELEVATORS: Barrett-Cravens Co., 4609 South Western Blvd., Chicago 9—Bulletin 5211 presents information concerning specifications, characteristics and operation of the company's complete line of industrial elevators and portable cranes.

For More Details Circle No. 134—Page 225

VAULT DOORS: Remington Rand Inc., 315 Fourth Ave., New York 10—Folder SC-728 concerns vault doors that offer certified fire protection to correspond to the rated resistance of

existing vaults and points out that inability to produce business records to substantiate reports made to governmental authorities can cause legal difficulties and financial loss as well as inconvenience and embarrassment.
For More Details Circle No. 135—Page 225

V-BELTS: Thermoid Co., 200 Whitehead Rd., Trenton, N. J.—Form 3787 features simplified conversion tables to help users determine what V-belt made by the company replaces one previously in use. All pertinent data are included.
For More Details Circle No. 136—Page 225

INDUSTRIAL TRUCKS: Lewis-Shepard, Dept. R-1, Watertown, Mass.—Two charts are designed to permit an objective, point-by-point comparative analysis of various makes of high and low lift, riding and walkie type electrical industrial trucks.
For More Details Circle No. 137—Page 225

WORK GLOVES: C. Walker Jones Co., 6135 North Lambert St., Philadelphia 38—Illustrated catalog describes industrial work gloves and lists the styles available. These include heat and flame resistant and other special application models.
For More Details Circle No. 138—Page 225

MATERIALS HANDLING: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3—Manual illustrates and describes the manufacturer's complete line of platform and fork trucks and floor cranes. Specifications and operating photos are included.
For More Details Circle No. 139—Page 225

REDWOOD: California Redwood Association, 576 Sacramento St., San Francisco 11—Technical data sheet on the use of California redwood lumber as pattern material describes its qualities, grades and applications.
For More Details Circle No. 140—Page 225

DIE CASTING ALLOYS: Samuel Greenfield Co., 31 Stone St., Buffalo, N. Y.—Folder lists chemical specifications, typical properties and characteristics of aluminum and zinc-base die casting alloys.
For More Details Circle No. 141—Page 225

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Photo courtesy of Supreme Brass & Aluminum Foundry, Los Angeles, Calif.

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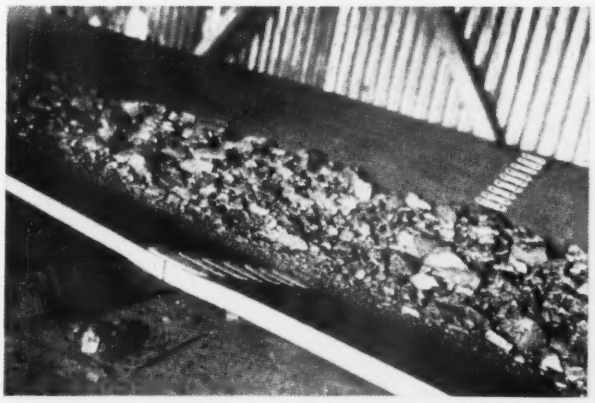

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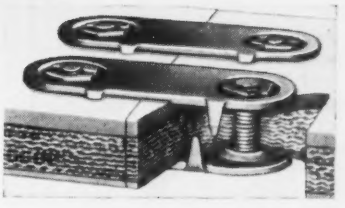

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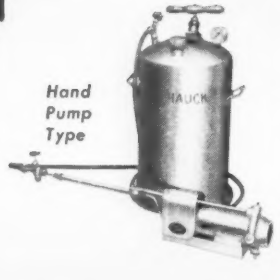


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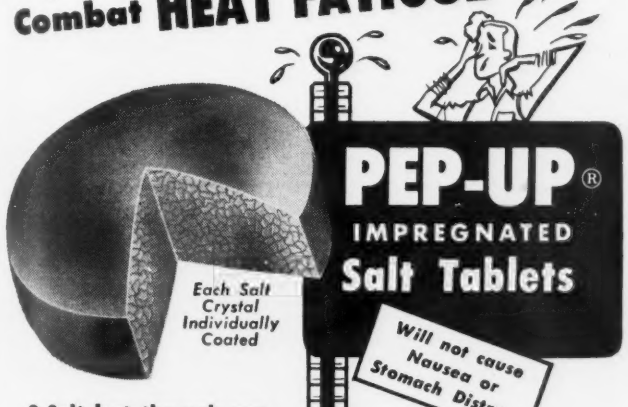


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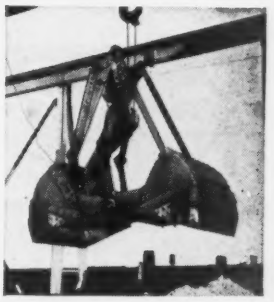

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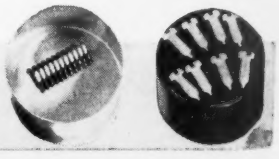

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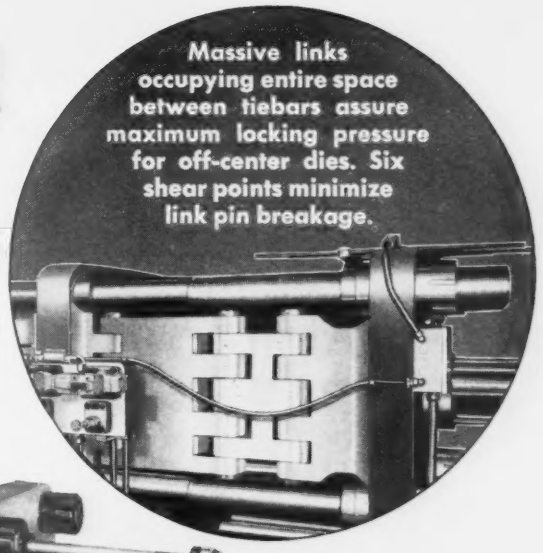

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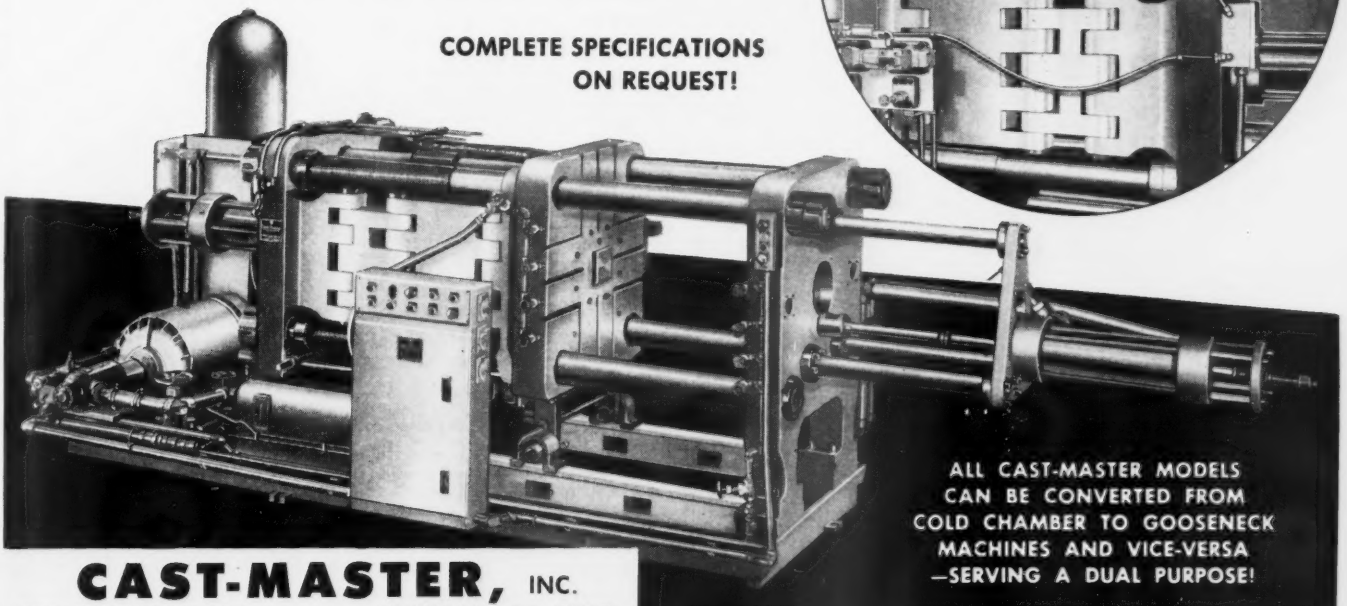

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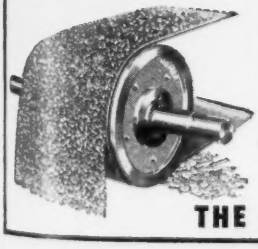
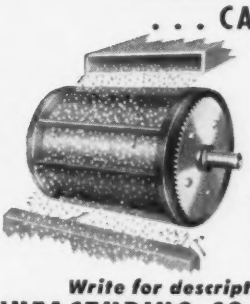
*FOR SAND SLINGERS, CONDITIONERS AND CONVEYORS . .*



Homer MAGNETIC PULLEYS and UNITS —Available in standard diameters from 12" to 30"; belt widths 4" to 60". Special sizes upon order.

*HERE IS THE ANSWER TO YOUR MAGNETIC SEPARATOR JOBS!*

**HOMER "Power-Plus" Magnetic Separators**
**Permanent non-electric—Unaffected by Heat, Cold, Moisture**
**. . . CAN BE USED INSIDE or OUTSIDE PLANT . . .**



Homer MAGNETIC DRUMS—Available in standard diameters from 12" to 30"; face widths 4" to 60". Can be furnished with or without enclosure.

Homer MAGNETIC PLATES—Available in standard widths from 4" to 26"; lengths and number of poles as required. Special fabrications to your specifications.

*Write for descriptive bulletins*

**THE HOMER MANUFACTURING CO., INC., DEPT. 156, LIMA, OHIO**

# . . . Just pull the trigger WITH THE MURPHY PISTOL SPRAYER

## and the HAMILTON SPRAY GUN

*$10.00 F.O.B. Hamilton, Obio*

Complete with a 4½ ft. length of suction hose and sinker. For spraying molds and cores with liquids, for cleaning motors and machinery, for laying dust, for spraying hot roofing materials, and many other uses. Trigger control, guaranteed.

Just pulling the trigger of the MURPHY PISTOL-SPRAYER shoots a stream of blackening into inner pockets that could never be reached by the old-fashioned brush or swab method. This sprayer was designed by a practical foundryman and now it is widely used for cleaning permanent molds, for aluminum and other metals, and also for sand-blasting.

PRICES COMPLETE WITH SUCTION HOSE AND SINKER

| PIPE SIZE | 1/16" | 1/8" | 1/4" | 3/8" | 1/2" |
|---|---|---|---|---|---|
| PRICE F. O. B. HAMILTON, O. | $12.00 | $12.00 | $12.00 | $14.50 | $18.00 |

*Also a complete line of products designed to banish moisture from all kinds of air compression systems — Aftercooler, Separators, Filters, Traps, and Regulators.*

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*Over a million sold to date*

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SPRAY GUNS • PISTOL SPRAYERS

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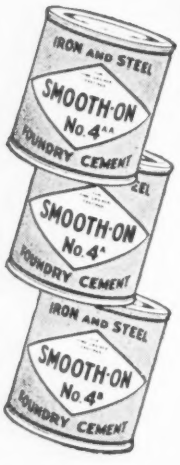
HAMILTON, OHIO
*Moisture Elimination Up To 3000 Pounds Per Square Inch*

## LIGHT — MEDIUM — DARK
## . . . a shade to match every iron or steel casting




Because different cast metals vary in shade and texture, Smooth-On No. 4 Foundry Cement is supplied in three shades, to match light, medium and dark gray metals. This enables you to make repairs that are almost invisible when you true up small holes, pock-marks, depressions. For light gray, finer textured metal you use Smooth-On No. 4AA, which may be filed and machined. Medium gray castings call for No. 4A. Dark gray castings of coarser texture are matched with Smooth-On No. 4B. If your supply house hasn't Smooth-On Foundry Cements, write us.

### FREE Samples and Handbook

Try Smooth-On No. 4 at our expense. Write for free sample in the shade you'd like to try. We'll send also the 40-page Smooth-On Handbook describing other Smooth-On Cements and their time-and-money-saving uses. Write TODAY.

**SMOOTH-ON MFG. CO., Dept. 17**
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**Do it with SMOOTH-ON FOUNDRY CEMENT**

## A. A. WICKLAND & CO.
### FOUNDRY CONSULTANTS
ENGINEERING BUILDING · CHICAGO 6, ILLINOIS

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Roller Bearing throughout
Direct Motor Drive with Speed Reducer
V Belt Motor Drive—Tight & Loose Pulley Drive
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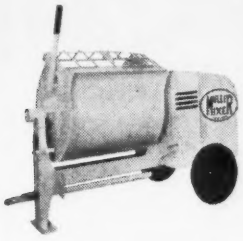
*YOU'LL LIKE OUR FAST SERVICE*
LETTERS – TRADEMARKS – Wood & Leather Fillet
*WRITE FOR CATALOG*
**CANTON PRODUCTS**
P. O. BOX 981-F CANTON, OHIO PHONE 5-8818

# BETTER CORES *make* BETTER CASTINGS



You can save time and money and make better cores with the Muller New 3½ Cubic Foot Core Sand Mixer. It mixes 250-300 pounds per batch. Better cores mean better castings. This new, labor-saving Core Sand Mixer will "buy itself" out of savings in a short time.

**PRICE: $344.00** complete with 1½ H. P. Electric Motor ready to plug in, F. O. B. Metuchen, New Jersey.

This Mixer is also available in 6, 6 to 8, and 9 Cubic Foot sizes

MULLER MIXER

**MULLER MACHINERY COMPANY, Inc.**
Metuchen 14, N. J. Cable Address: MULMIX

# Master Power
**HARD CHROMED • PORTABLE PNEUMATIC TOOLS**

**DO MORE WORK AT LESS COST**
because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

**ARE PREFERRED BY OPERATORS**
because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

**IF YOUR PROBLEM INCLUDES**
chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

**THE MASTER PNEUMATIC TOOL COMPANY, INC.**
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SALES ★ SERVICE ★ STOCK ★ COAST TO COAST

# COLUMBIA-SOUTHERN SODA BRIQUETTES

## *For CONVENIENT, FAST, THOROUGH DESULPHURIZING*

In either blast furnace or foundry, the job of sulphur reduction in iron is done effectively with economical Columbia-Southern Soda Briquettes. The pellet form of Briquettes provides greater surface contact with iron, thus assuring faster, more thorough desulphurization.

Columbia-Southern Soda Briquettes are dustless, eliminating waste and improving general working conditions. Packed in 100 lb. paper bags, they're easy to handle and store.

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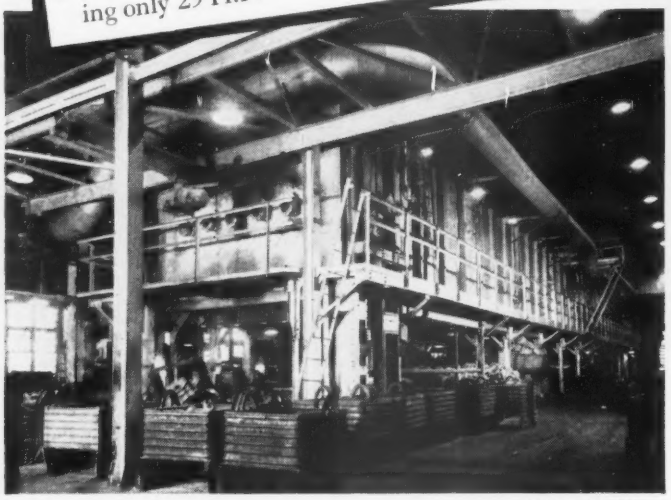
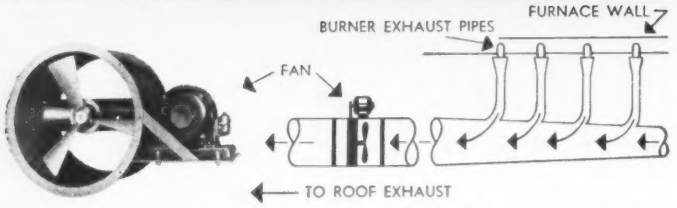
## INTERNATIONAL HARVESTER SAYS:

# Propellair Fans "Very Satisfactory"

**PROBLEM**—To exhaust 196° combustion products from 222 burners in 8 radiant tube annealing furnaces.

**SOLUTION**—A unique exhaust system using 9 Propellair Fans with total CFM of 70,607, requiring only 29 H.P.






■ Engineers for the McCormick Works of International Harvester in Chicago accomplished a neat trick in using a minimum of ductwork and only six 24″ and three 30″ ventilating fans in an exhaust system for 8 radiant tube furnaces.

Propellair Belt-Driven Fans (with motors outside airstream) were selected because of their record for exhausting explosive fumes with safety and efficiency. These fans have now been in continuous operation for 2 years—24 hours a day, 7 days a week. International Harvester says "results have been very satisfactory and maintenance at a minimum."

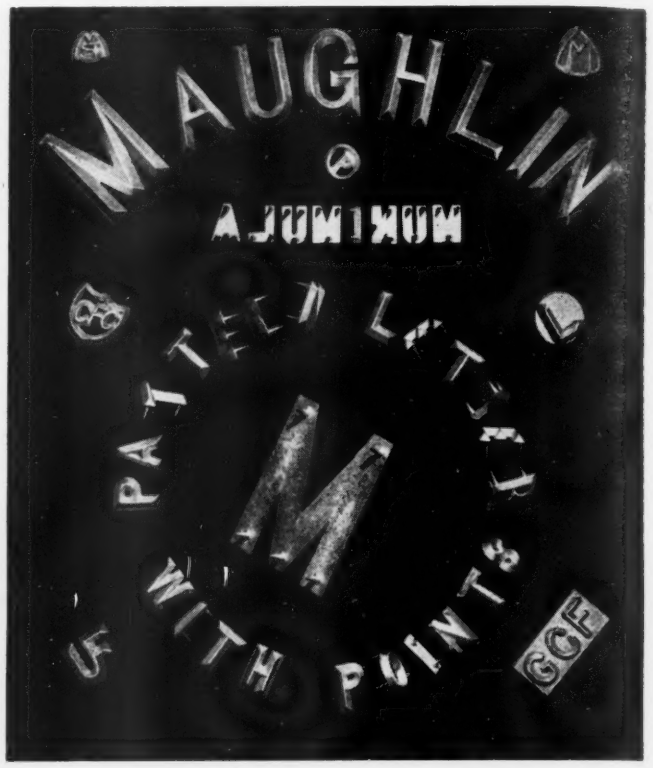
**What's Your Ventilating Problem?**

Propellair specializes in industrial fans designed for specific ventilating requirements. Propellair features include cast aluminum airfoil propellers, curved entrance rings, R&M *"All-Weather"* motors, certified air deliveries. Qualified sales engineers are available for consultation without obligation.

***Write for Catalog 3082F***

**PROPELLAIR®**
DIVISION OF ROBBINS & MYERS, INC.
SPRINGFIELD · OHIO

*A Hammer Blow Secures Letters To Pattern*

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**953 Ingleside Ave., Columbus, Ohio**
*Manufacturers of letters and numbers exclusively for over 30 years*

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*For low cost cleaning*

- AMASTEEL is the blast cleaning material that is engineered for the job.
- AMASTEEL assures the lowest cleaning cost.
- AMASTEEL lasts many times longer. Investigate!
- AMASTEEL provides peak efficiency in shot for blast cleaning and peening. Developed by the maker of "PEENBLAST", "CLEANBLAST" and "ALLOY 99".

*Abrasive for any and all kinds of work.*

PRODUCERS OF
**PEENBLAST**
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*"Uni-Wash"*
**DUST COLLECTORS**
**Recirculating Water Type —Compact—Efficient—Proven by Foundry Users**

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**More Air Circulation— Faster Bake and Better Cores**

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# WATERLOX
**TRANSPARENT CASTING SEALER**

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**It Saves Time!**
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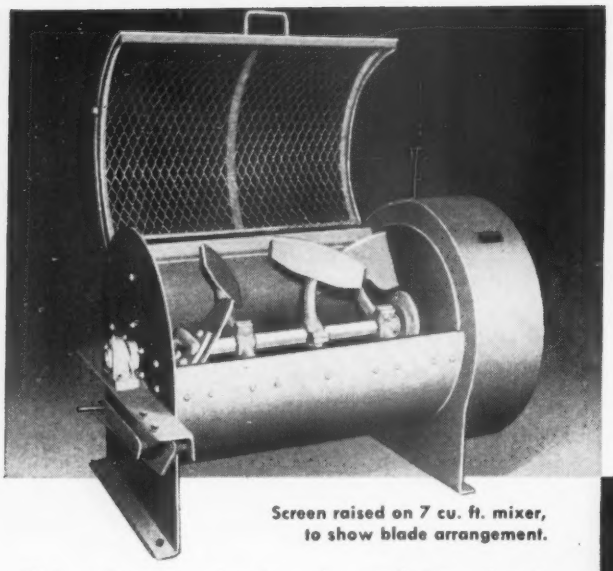
*Get Impregnating Details From*

**WATERLOX DIVISION**
of
THE EMPIRE VARNISH COMPANY
2636 E. 76th St. CLEVELAND 4, OHIO

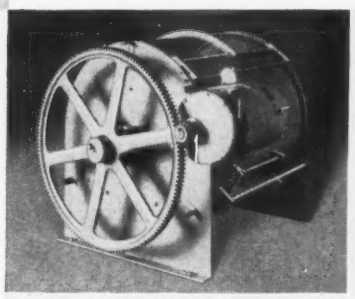


Screen raised on 7 cu. ft. mixer, to show blade arrangement.

# For a fast 4-minute mix—
# MULTI-MIXER

- With multi-blades for perfect mixing
- Direct drive motor, no clutch or belts
- Wear resistant liners and paddles

*Get a fast 4-minute mix and ½-minute discharge for your core and molding sands, and cupola patch mixes. Get a perfect mix too, with the best blade arrangement in any mixer—it cuts, turns, and kneads ten times with each shaft revolution. These trouble-free Multi-Mixers come in capacities from 3 to 60 cubic feet. Larger and special mixers made to our specifications. See your foundry equipment dealer or write us direct.*

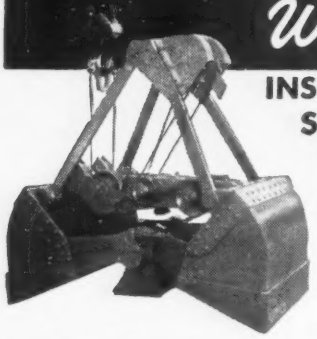


Rear view of 7 cu. ft. mixer, with gear guard removed, showing direct drive motor. Anti-friction bearings throughout. Quick acting discharge door is operated from the front of the mixer. Mixers are shipped complete, ready to install and operate.

*MULTIPLEX MACHINERY COMPANY*

DIVISION OF MULTIPACK, INC. • ELMORE, OHIO

# WELLMAN
## *Williams Type*



**INSTANT "ON-AND-OFF" SERVICE ANYWHERE**

The Wellman "Hook-on", single-line bucket is designed to provide clamshell bucket service at any crane hook where suitable head room and hoist capacity are available.

Hook the yoke over the crane hook and the bucket is ready for work. When the job is finished, take the yoke off the hook and the crane is free for other duties.

Capacities from ⅜ to 2 cubic yards. Write for free bulletin.

**THE WELLMAN ENGINEERING CO.** 7019 CENTRAL AVE. CLEVELAND 4, OHIO

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## "THAT GOOD"
## FOUNDRY COKE

**DEBARDELEBEN COAL CORPORATION**

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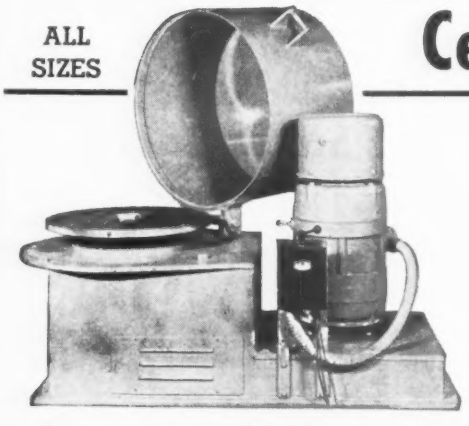
Phone 3-9135

ALL SIZES



# Centrifugal Casting Machine

HORIZONTAL—VERTICAL

Permanent Molds for Ferrous or Nonferrous Metals

BUILT TO MEET YOUR REQUIREMENTS

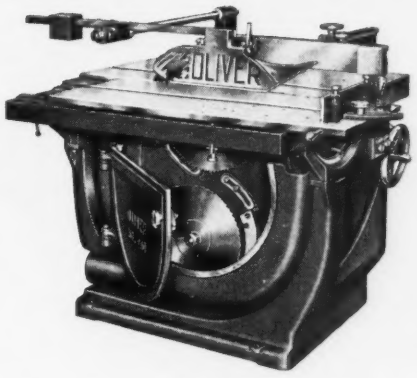
For Better Castings at Lower Cost, consult

**AIMES COMPANY, INC.**

1740 E. 12 ST. CLEVELAND 14, OHIO

# "Oliver" Double Arbor Tilting Saw Bench

**Rip and cross-cut on one machine**



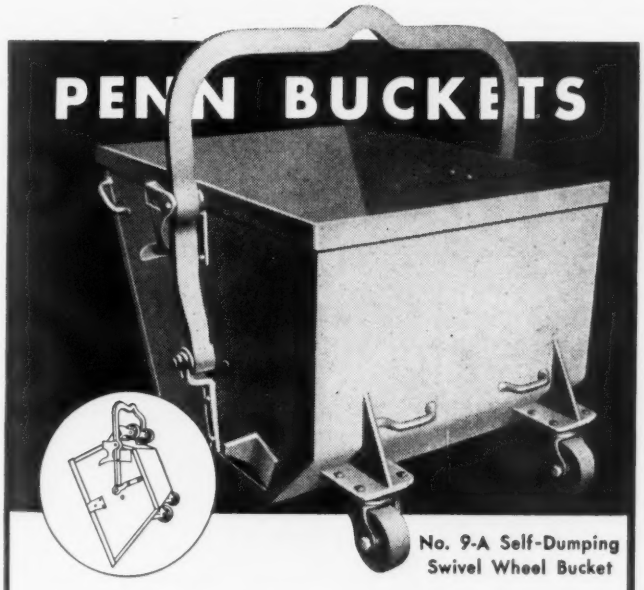

This double-duty machine saves pattern makers valuable time. A shaftless motor is built directly on each of two saw arbors. Either rip saw or cross-cut saw can be brought into action by turning the handwheel. Table remains horizontal while saw tilts up to 45°. Arbors can be adjusted vertically. Rips up to 24¼" wide, cross-cuts up to 36" wide. A 16" saw projects 3¾" through table. Dadoes up to 4" wide. Cuts a perfect miter. Most complete and accurate set of gauges.

***Write for Bulletin No. 260-D***

**OLIVER MACHINERY COMPANY**
**GRAND RAPIDS 2, MICHIGAN**



# PENN BUCKETS



No. 9-A Self-Dumping Swivel Wheel Bucket

Careful balancing makes Penn Buckets self-dumping when loaded and self-righting when empty. Welded construction prevents "clinging", makes them empty easily and completely. The swivel wheels increase handling efficiency, too.

FEMA

**WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST**

**PENN IRON WORKS, INC.**
**READING, PENNA.**

PP INC.

# What's Your Scrap Loss?

A *few cents* invested in genuine Porcelain Products Ceramic Strainer Cores *can save you dollars in production costs!*

With PP INC. Ceramic Strainer Cores in the gates, you'll turn out *improved* castings free from slag . . . *cleaner* castings that mean *fewer rejects* and *less time* in the cleaning room. In short, *higher quality* castings for your customer . . . *and at no extra cost,* because the additional foundry profits realized from increased production, fewer rejects and lower cleaning costs will more than pay for PP INC. Ceramic Strainer Cores used.

May we send samples and complete information?

**Look at these Advantages . . .**

- Economical to use . . . pay for themselves.
- Substantially reduce chipping, welding and grinding.
- Dependable . . . won't fracture under molten heat.
- Available in sizes to cover a wide range of requirements.
- Packed for safe, easy handling.

**Porcelain Products, Inc.**
**FINDLAY, OHIO**

THIS part is ours

We have two gloves, especially designed to lower glove costs in your business.

SURETY
TRIPL-PALM

Made with an extra abrasion-resisting coating applied to the palm for longer wearing and more cushion.

SURETY
ARMOR GRIP

Made with closed, flexible metal zippers permanently bonded in rubber to palms and fingers providing greater resistance to cutting, unusual gripping action and the maximum wearing qualities of any coated glove.

THIS part is yours

Try either glove or both in your own plant under actual working conditions. Convince yourself that SURETY can really lower your glove costs.

MAIL THIS COUPON TODAY

OK, Convince me. Send me TRIPL-PALM ☐ ARMOR GRIP ☐

on memo billing, and I'll give them a fair trial.

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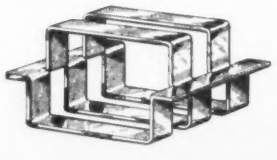
CHAPLETS

GENEVA
CHAPLETS



Note design that eliminates nuisance of tangling and lost time separating individual chaplets. Here is a light, strong chaplet whose shape gives a good bearing surface, and yet leaves a small surface mark. For prices,

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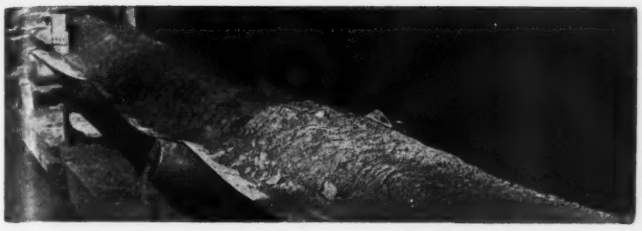
Smith & Richardson
MANUFACTURING COMPANY
MANUFACTURERS OF HINGE TUBES, CHAPLETS AND FOUNDRY SPECIALTIES
GENEVA • ILLINOIS



## Here's your answer to DOWN-TIME!

DANDUX Pyroflex, Insulex and Double Insulex hot belts positively reduce down-time losses. Dandux belts are built specifically for the *job* and its *temperature range* . . . Built to higher standards of quality, they render unexcelled on-the-job performance. Call, without obligation, a Dandux expert to discuss *your* down-time problems.

Stitched Canvas Belting

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A-2757

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A COMPLETE FOUNDRY SERVICE

**MODERNIZATION**

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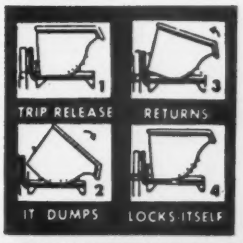
# *Reduce* FATIGUE

Use *Self-Dumping* Containers

*Step Up* PRODUCTION




## *Save 50% Labor-Time with* ROURA Self-Dumping HOPPERS

*Imitated by Many— Not Equaled by Any*

*—they pay for themselves*

**Only ROURA Has The Exclusive PATENTED Instant Release Handle**

Handling wet or dry, hot or cold, bulky materials quickly and easily, the ROURA is simple to operate—only one man is required for distributing and unloading—and he does this in much less time than ordinarily required under old-fashioned manual methods. Thousands of Roura Hoppers (which fit any standard fork or platform lift truck) are in constant daily operation, serving and saving for such firms as Owens-Illinois Glass, Corning Glass, National Fireproofing, General Motors, Ford, Chrysler, American Brake Shoe, General Electric, Westinghouse, Western Electric, American Steel Foundries, International Harvester, John Deere, etc.

By a simple lift of the exclusive release handle, the ROURA HOPPER dumps, rights and locks itself securely. Sizes—½, ¾, 1, 1½ and 2 cubic yards; the ROURA HOPPER can also be designed for flat trucks and in other sizes to meet specifications. Also, it can be equipped with special flanges that permit stacking to desired tiers for storage or future distribution of materials—conserving valuable floor space. Priced below all competition, the ROURA will quickly pay for itself many times over.

—Can Be Coated With Acid-Resistant Paints

*Write today for detailed brochure, "In Dollars & Sense."*

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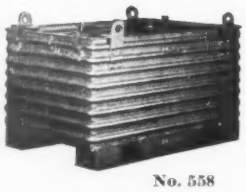
Here's why

Rugged BRUSCO handling equipment increases efficiency

**BRUSCO CORRUGATED STEEL BOXES**

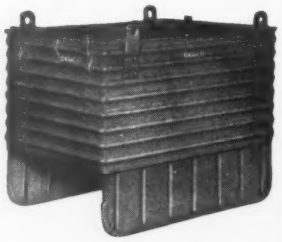
Save floor space — stack safely from floor to roof. Four way entry for fast, efficient handling. Equipped with crane lugs for movement by crane. Fabricated from heavy gauge corrugated steel to give added rigidity and maximum strength. Thoroughly and securely arc welded for longer, maintenance free life. Made in various sizes and load capacities to suit your requirements.



No. 558

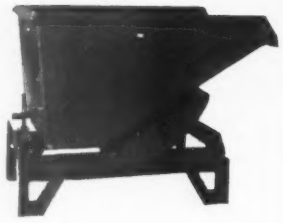
**No. 559 BRUSCO CORRUGATED SKID BOX**

Saves valuable floor space and speeds production. Made in all sizes and various gauges of steel to fit any load capacity. Stack from floor to roof.



**No. 1210 BRUSCO SELF DUMPING HOPPER**

Speeds production and saves labor in handling your parts and materials. This hopper is fabricated of heavy steel plate thoroughly reinforced. Made in ½, 1, 1½ and 2 cubic yard capacities. Underclearance is optional.



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BRUMMELER STEEL PRODUCTS CORPORATION

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**133 pages, illustrated**
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To help foundrymen minimize and eliminate defective castings. Thirty-one basic casting defects are listed and described. Defects are defined simply and completely, illustrated by 101 figures collected from foundries of the United States and Canada.

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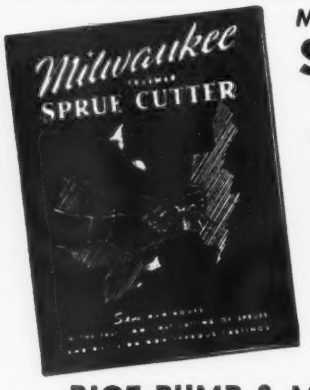


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- Cuts Sprues and Gates with One, Swift, Sure Stroke.
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spreads like paste
hardens into metal
NO HEAT OR SPECIAL TOOLS
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*No more rejects due to poor dry—*

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*"Radiant Heat"*

## CORE DRYING SYSTEMS

**From the records of the Chicago Aluminum Casting Company—the fastest and most economical method of core drying is Burdett gas-fired, Radiant Heat. Here is what the records show:**

1. Rejects are now eliminated, because every core is thoroughly dry in specified time regardless of load density.
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Modern foundries have found it practical to color their various grades of core sands. This eliminates guesswork and assures the proper use of the required type of core sand for the particular job at hand.

Our laboratories have developed a line of special dyes in a range of colors that have been carefully tested and found suitable as well as economical.

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The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

*Send for Bulletin 300*

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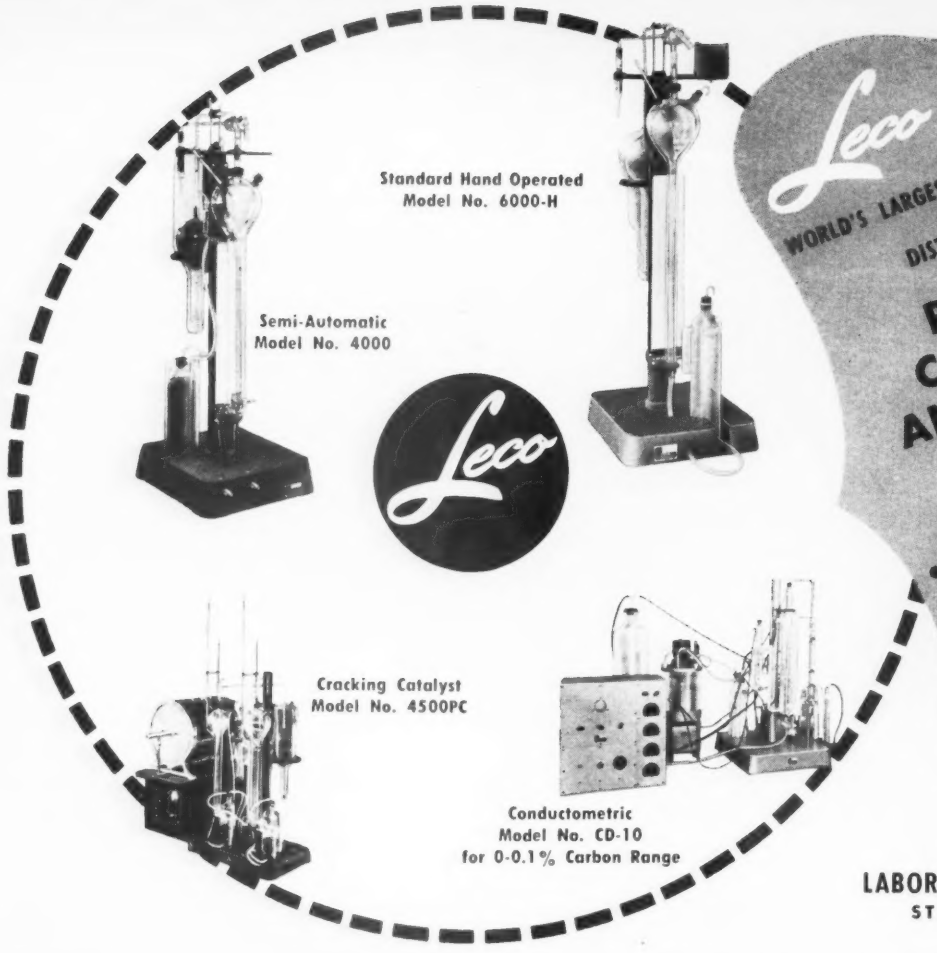


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13 HELPFUL CHAPTERS ON ALL PHASES OF THE CUPOLA. "How To Use The Cupola" .... 13 idea-packed chapters based on the practical experience of a man who has devoted his life to foundry fuel and melting problems. It's a mighty useful handbook—a handy source of information which will pay for itself many times over in the months and years ahead.

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**SPECIAL SILICAS**

SIZE RANGE FROM 100 MESH TO 600 MESH

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- All grades of silica ideal for precision casting by the investment molding process
- Will meet the exacting requirements of most precision casting work
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# GRAY IRON FOUNDRIES
## Simplify Chill Control . . .

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Available in 1, 2, 3, and 4-gram tablets; also in powder, slabs and sticks. For full information, write Dept. LM for 16-page article on the use of TELLURIUM in chill control.

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**GLOSSARY OF FOUNDRY TERMS**
*Compiled by Ed Bremer, FOUNDRY Metallurgical Editor*

This extensive glossary of foundry terms was compiled from a wide variety of sources. Arranged in handy booklet form, it is a valuable reference for every foundryman. *32 pages.* **$1.00**

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**AN EXCELLENT BRASS FLUX**
***—Economical—***
**THE BASSICHIS COMPANY**
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**shows how new *Arcair* TORCH**
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Here are facts and photographs that demonstrate the time and money saving performance of the Arcair Torch. Arcair uses only electric arc and compressed air, operates at far lower hourly cost than other processes. *Trademark*

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# SMOOTHER CORES
# DRYING TIME IS CUT
# DISCARDS REDUCED

**LARGEST SELLER IN THE FIELD!**

Kordek, the preferred dry bond for cores...

Full technical service, without obligation, is available to show how you can profit from the use of MOGUL® Cereal Binder in your production.

***Write Technical Sales Department***

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# CLASSIFIED ADVERTISING

## Help Wanted

**SUPERINTENDENT**

Prominent machine tool and aircraft engine accessory company located in central Connecticut is establishing a position requiring a man experienced in the field of Precision Investment Castings. This man will assume complete charge of the procurement and quality control of all of the company's precision castings. Man must be of high calibre, a good organizer, and have a proven knowledge of the methods and techniques of Precision Investment Castings and also of X-ray techniques used in the inspection of nonferrous castings. Excellent opportunity for advancement. New products and greatly expanded production schedules will place this company among volume users of Precision (Investment) Castings. Write giving full details of experience. All replies will be kept in strict confidence.

**BOX 596**

**FOUNDRY** **CLEVELAND 13, OHIO**

**UNUSUAL OPPORTUNITY IN METALLURGICAL SALES**

Here is an unusual opportunity for an up-and-coming young man who has cast iron foundry experience and who would like to increase his earning power by using his experience in technical sales work. The company is one of the most substantial and oldest producers of metallurgical materials for the iron and steel industries. The location is Chicago. The sales group is small and select. If you are an engineering graduate, 25 to 30 years old, with 3 or more years' experience in cast iron melting, and wish to make your career in technical sales—please write giving your age, education, training, experience, and salary expected. Your reply will be treated with the strictest confidence.

**BOX 575**

**FOUNDRY** **CLEVELAND 13, OHIO**

**MOLDER-FOREMAN-MANAGER**

Very small nonferrous foundry needs intelligent, skillful, aggressive working bench molder foreman. Experience or interest in French Sand or very fine quality castings important. Opportunity to own interest in foundry. Church goods, tablets, crematory urns, hardware, etc. is our line. Room to take on other customers. Now doing some outside work. Nicely equipped, excellent housing available. Location: Southern Connecticut. Address: Box 492, FOUNDRY, Cleveland 13, Ohio

**FOUNDRY SUPERINTENDENT**

Unusual opportunity in medium size brass, aluminum and iron foundry. Long-term expansion program requires superintendent with thorough knowledge of machine and floor molding, gating and setups for jobbing and production work. Applicant must know all phases of foundry work and be capable of producing pressure-tight and porous-free castings economically. Prefer applicant not over forty-five years of age. State qualifications and salary expected. Address: Box 539, FOUNDRY, Cleveland 13, Ohio.

**METALLURGIST**

Malleable iron, New England. Must be able to organize and operate lab. Two analyses per day. Assistant later if required. Right man will ultimately be in charge of quality of product from melting through annealing. Small foundry. Address: Box 454, FOUNDRY, Cleveland 13, Ohio.

**FOUNDRY SUPERVISORY PERSONNEL**

Qualified foreman for all operations in highly mechanized, established malleable foundry. Positions open immediately. Must be familiar with progressive foundry techniques. State qualifications. Located: Midwest.

**BOX 533**

**FOUNDRY** **CLEVELAND 13, OHIO**

**SALES MANAGER**

Man with sales experience in foundry field who must know core room practice. Excellent opportunity to head up sales department in marketing of new type synthetic resin binders. Salary plus commission. Address: Box 595, FOUNDRY, Cleveland 13, Ohio.

## Help Wanted

**CHEMIST**

An old established foundry facing manufacturing company, is in need of a chemist. Location: Middle States.

**BOX 536**

**FOUNDRY** **CLEVELAND 13, OHIO**

**TOP LEVEL PRACTICAL MALLEABLE FOUNDRYMAN**

Malleable foundry in midwest has unusual opportunity for man with knowledge of designing and rigging of pattern equipment, knowledge of molding, and ability to direct supervisors in all departments.

Please state salary expected. All replies confidential and will be answered.

**BOX 589**

**FOUNDRY** **CLEVELAND 13, OHIO**

**FOUNDRY ENGINEER**

As an assistant to plant engineer of a progressive Eastern steel foundry. Must be mechanical graduate and capable of carrying duties in plant engineering, maintenance and construction work. Write giving full details on personal background, experience and salary expected.

**BOX 573**

**FOUNDRY** **CLEVELAND 13, OHIO**

**METALLURGIST—GRAY IRON**

Familiar with cupola operation and gray iron practices.

**BOX 591**

**FOUNDRY** **CLEVELAND 13, OHIO**

**FOUNDRY METALLURGIST**

Must be full experienced in controlled melting and pouring of malleable and gray iron. Please give full background details—professional and personal, also salary desired. Replies held in confidence. Address: Box 582, FOUNDRY, Cleveland 13, Ohio.

**INDUSTRIAL ENGINEER**

List past experience and also state salary expected in first letter. Must be familiar with foundry work. Address: Box 583, FOUNDRY, Cleveland 13, Ohio.

**SALES OR PRODUCT DEVELOPMENT ENGINEER**

Industrial sales engineer with sound knowledge of basic engineering principles and preferably with some cast iron foundry experience. Permanent position with well established corporation with opportunity for advancement. Send details: age, experience, etc. Address: Box 568, FOUNDRY, Cleveland 13, Ohio.

**WANTED IMMEDIATELY**

Experienced matchplate man with all qualifications necessary to carry on the complete process in the making of matchplates. Address: **HAINES MATCHPLATE COMPANY, 217 NORTH TOWNSEND, TYLER, TEXAS.**

**PATTERN MAKER**

Experienced pattern maker for trouble work on patterns. Must be experienced in gating, rigging and able to handle men. Address: Box 569, FOUNDRY, Cleveland 13, Ohio.

**MOLDING FOREMAN**

For steel foundry located in East. Require experience and knowledge in gating and risering, machine molding, sands, and coremaking. Address: Box 574, FOUNDRY, Cleveland 13, Ohio.

## Representatives Wanted

**SALESMEN**

Excellent future offered in selling shell molding resins in two Midwest territories for men with right qualifications—experienced in self-management and foundry sales, a leaning toward technical problems and some knowledge of gating, core and molding practice. Compensation includes car, salary, expenses and incentive. Write giving full details to:

**THE BORDEN COMPANY**
**CHEMICAL DIVISION**
**350 MADISON AVENUE**
**NEW YORK 17, NEW YORK**

**METALS, MINERALS, CHEMICALS**

Salesman, with industrial clientele, wanted on high commission. Write complete personal and sales data in confidence. Include photo. **BRAM CHEMICAL CO., 820—65TH AVE., PHILADELPHIA 26, PENNSYLVANIA.**

## Positions Wanted

**GRAY IRON FOUNDRYMAN**

Available. Capable, qualified and experienced to direct all phases of foundry activities. Light to medium heavy work. Green and dry sand. Well versed in cupola operation and metallurgy. Fifteen years in present executive position. Middle aged. Good appearance. Pleasing personality. Address: Box 437, FOUNDRY, Cleveland 13, Ohio.

**ENGINEER**

Desire responsible position in foundry production or engineering. Experience in mechanized gray iron foundry as assistant plant engineer two years; plant engineer, three years. Presently employed. Age: 30, married. Mechanical engineering graduate. Address: Box 597, FOUNDRY, Cleveland 13, Ohio.

**INDUSTRIAL ENGINEER**

Several years of experience in gray iron, malleable and steel. Will reduce cost and increase production. Very capable of running department efficiently, also assist management in all problems. Address: Box 494, FOUNDRY, Cleveland 13, Ohio.

**GENERAL COREROOM FOREMAN**

Jobbing or production coreroom, large or small work, bench, floor, rollover machines, coreblowers. Well versed in all types of core-room equipment, drying cores, mixing sand. Better cores at reduced costs, and increased production. Young, reliable and good labor relations. Address: Box 581, FOUNDRY, Cleveland 13, Ohio

**FOUNDRY SUPERINTENDENT OR MANAGER**

Practical and capable foundryman with 30 years' experience. Good rigger on patterns, flasks and machines, on jobbing and production work. Can manage help and labor. Able to estimate and figure castings from drawings to finished product. Well versed on cupola practice, high test, regular and soft iron. Prefer to make contact with a captive or semi-captive foundry. Address: Box 598, FOUNDRY, Cleveland 13, Ohio.

**FOUNDRY MANAGER**

Capable of taking complete charge of all foundry operations, both gray iron and brass. Technical graduate in mechanical engineering. Twenty-eight years of experience in both light and heavy jobbing and production work especially in automotive, machine tool and pressure castings, in mechanized and floor type foundries. Have had actual experience in molding, coremaking, melting and metallurgy. Through this practical experience have acquired a good labor-management relationship. References available. Address: Box 526, FOUNDRY, Cleveland 13, Ohio

**FOREMAN**

Gray iron experience. Jobbing and production. Address: Box 587, FOUNDRY, Cleveland 13, Ohio.

**METALLURGIST**

B. S. in metallurgical engineering. Experienced in carbon, high alloy, steel and gray iron. Knowledge of laboratory procedures, sand control and heat treating. Seeking permanent position. Address: Box 599, FOUNDRY, Cleveland 13, Ohio.

# Positions Wanted

**SUPERINTENDENT**

With 28 years' experience producing quality castings in general jobbing and production, machine tool, cylinders and pressure castings. Well versed in machines, rigging, gating, cupola, green and dry sand molding, working from blueprints. Age 49. Address: Box 580, FOUNDRY, Cleveland 13, Ohio.

**FOUNDRYMAN**

Desire position as general foundry foreman. Twenty-five years' experience in jobbing and production of steel castings. Cost minded and scrap conscious. Age 43. Perfect health. Address: Box 588, FOUNDRY, Cleveland 13, Ohio.

**EXECUTIVE**

Experienced in all phases of foundry operations. Steel, iron nonferrous, plant and industrial engineering, cost control, accounting, industrial relations, machining administration. Address: Box 408, FOUNDRY, Cleveland 13, Ohio.

**FOUNDRYMAN**

Desires position as superintendent or general foreman. Practical man. Twenty-seven years' experience in gray iron, ductile iron and nonferrous, jobbing and high production shops, soil pipe and farm implements. Address: Box 447, FOUNDRY, Cleveland 13, Ohio.

**FOUNDRYMAN**

Danish, with certificate, desire position as general foreman or superintendent in Canada or U.S.A. Sixteen years' experience in all phases of foundry operations. Speak and write English. Address: Box 590, FOUNDRY, Cleveland 13, Ohio.

**GRAY IRON FOUNDRYMAN**

Practical, technical, 49, graduate metallurgist with 28 years' broad experience in conventional and highly mechanized foundries. Well versed in molding machines, cupola, cores, sand control. Position with reliable firm wanted. Address: Box 579, FOUNDRY, Cleveland 13, Ohio.

**PERMANENT MOLD EXECUTIVE AND ENGINEER**

Top-flight expert with 28 years' experience in aluminum and magnesium. Will go anywhere. Address: Box 534, FOUNDRY, Cleveland 13, Ohio.

**WEIGHT ESTIMATING**

Estimating of casting weights furnished by return mail. Accurate, reliable and confidential service. Automatic calculator equipment. Nominal fee. Send blueprints to: CHARLES E. ROLAND, ITASCA, ILLINOIS.

**FOUNDRY ENGINEER**

Mechanical engineer graduate, age 31, four years' diversified foundry work, iron, steel, nonferrous, and machine shop experience. Ambitious, industrious, prefer sales, will consider other. Address: Box 576, FOUNDRY, Cleveland 13, Ohio.

**FOUNDRY ENGINEER AND PATTERNMAKER**

Graduate of University of Pittsburgh, 1950. Degree in mechanical engineering, 30 years old. Journeyman metal patternmaker. Present position: Assistant to works manager of large gray iron and nonferrous Midwest foundry. Desire position in Philadelphia-Reading area. Address: Box 584, FOUNDRY, Cleveland 13, Ohio.

**MAINTENANCE MAN**

Experienced maintenance man, fifteen years with large foundry and machine shop. Ten years responsible supervising. Top reference. Address: Box 532, FOUNDRY, Cleveland 13, Ohio.

**GENERAL MANAGER**

Mature, profit-minded, aggressive. Successfully managed five companies—three taken out of the red. Trained two successors, both made good. Qualified to carry complete administrative responsibility and develop all profitable possibilities. Excellent experience foundry, machinery and related lines. Address: Box 554, FOUNDRY, Cleveland 13, Ohio.

**MANAGER—SUPERINTENDENT**

Twenty-eight years of gray iron experience and some nonferrous. Outstanding practical and technical background. Have supervised as many as three hundred men, 125 tons daily, production and jobbing, mechanized or semi. Excellent cost man, ability to handle men and can obtain results. Age 47. Address: Box 443, FOUNDRY, Cleveland 13, Ohio.

Graduate, experience duplex malleable, melter experience, laboratory control of metal, sand, cores, annealing. Will change to steel or gray iron. Address: Box 543, FOUNDRY, CLEVELAND 13, Ohio.

# Opportunity

**OPPORTUNITY FOR A FOUNDRY**

For Sale: Patterns for complete line of cast iron fittings together with jigs and fixtures. Forty year old business now doing $250,000.00 per year. National sales organization. Write:

**BOX 585**

**FOUNDRY CLEVELAND 13, OHIO**

# Positions Wanted

**TECHNICAL DIRECTOR OR METALLURGICAL EXECUTIVE**

Graduate metallurgist with 17 years' experience. Outstanding reputation in field of sand, permanent mold, die, plaster and investment casting of light metal and other nonferrous alloys. Also well known in field of stainless steels and high temperature alloys. Capable writer and speaker. Practical as well as administrative experience. Address: Box 572, FOUNDRY, Cleveland 13, Ohio.

# Wanted-To-Buy

**WANTED**

Furnace Transformers

**DELL STEPHENSON & COMPANY**
**14456 GLASTONBURY**
**DETROIT 23, MICHIGAN**
**TEL: VERMONT 5-0697**

**MIXERS WANTED**

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, FOUNDRY, Cleveland 13, Ohio.

**WANTED**

Reda Melting Furnace, #400 or #450. Address: **KENNETH LYNCH & SONS, WILTON, CONN.**

**WANTED**

Spo #3070 jolt pin lifter. Address: **PRECISION ALUMINUM FOUNDRY, 5269 W. GRAND AVENUE, CHICAGO 39, ILLINOIS, MERRIMAC 7-0200.**

**MACHINERY WANTED**

Induction Furnaces, Screens, Simpson Mixers, Riehle Compression Testing Machines, Pulverizers, Grinders, Conveyors. Address: **P.O. BOX 1351, CHURCH STREET STATION, NEW YORK 8, NEW YORK.**

**WANTED TO BUY**

Dust Collector—10,000 CFM Capacity, 5 ton electric hoist, 14 x 12 Ingersoll-Rand Air Compressor. Address: **THE SHEAHAN COMPANY, 4711 WEST ELECTRIC AVENUE, MILWAUKEE 14, WISCONSIN.**

**WANTED TO BUY**

Tabor abrasive cut off machine. Must be in good condition. Advise price. Address: **COLUMBUS BRASS & ALUMINUM CO., INC., COLUMBUS, INDIANA.**

**WANTED TO BUY**

Whiting Cupola 18" to 23" inside lining. Address: Box 593, FOUNDRY, Cleveland 13, Ohio.

# Foundries For Sale

**FOR SALE**

Well established pressure cast matchplate concern in Midwest. Annual sales over $125,000. Address: Box 524, FOUNDRY, Cleveland 13, Ohio.

**FOUNDRY FOR SALE**

Soil pipe fitting patterns—2", 3" and 4". Soil pipe machine patterns—2" and 4". Will make 3" pipe. All master patterns, core machine, portable building, machinery and equipment to make soil pipe and fittings. Reasonable and terms. Address: **H. J. BROWN, 2008 PORTLAND AVENUE, SHREVEPORT, LA.**

# Foundries For Sale

**FOUNDRIES FOR SALE**

IRON FOUNDRY. Fifteen tons daily capacity. Produces high quality jobbing work. Price: $45,000, easy terms. Location New England.

IRON FOUNDRY producing 25 tons small machinery castings per day. Excellent equipment for low cost production. Well trained personnel. This plant is priced low.

IRON FOUNDRY completely mechanized plant producing 100 tons per day.

**EDWARD H. ZOLL**

**FOUNDRIES SOLD AND LEASED**

**790 BROAD ST. NEWARK 2, N. J.**

**FOR SALE RENT OR PARTNER**

Foundry centrally located. Large outside area. Gray iron and brass. Equipped for hand molding. Terms can be arranged. For further information write to:

**BARNETT BROTHERS FOUNDRY**

**118 MAPLE AVENUE PUNXSUTAWNEY, PA.**

**SMALL FOUNDRY FOR SALE**

On New York Central Railroad side track in Lockport, New York. Floor space of molders approximately 11,000 square feet with exceptional dumping ground for disposal of slag and waste indefinitely at lowest expense over declivity on the land. Considerable foundry equipment thrown in for the price of assessed value of the real estate. Address: JEFFERSON UNION COMPANY, LOCKPORT, NEW YORK.

**FOR SALE**

Brick and steel foundry, Southern Illinois, 160 x 320 feet, overhead monorail water transportation available. Ideal for mechanized operation, contains equipment. Address: Box 570, FOUNDRY, Cleveland 13, Ohio.

**FOUNDRY FOR SALE**

Nonferrous foundry located in Midwestern city of over 400,000 population. Brass melting capacity, 10,000 pounds per day. Aluminum melting capacity, 6,000 pounds per day. Annual sales volume, $200,000.00. Ideally situated with additional profitable sales potential. Owner advised by physician to retire from present responsibilities. Box 527, FOUNDRY, Cleveland 13, Ohio.

# For Sale

**FOR SALE**

2—International Core Blowers.
Type SB 13—Serial Number 56032-1
Complete with hoppers
Never been used.
1—Pangborn Sand Blast Cabinet.
4' x 5' Diam.
A-1 Condition

**THE CASTWELL FOUNDRY COMPANY**
**73 WYTHE AVENUE BROOKLYN 11, N. Y.**

**MILWAUKEE BRIQUETTING PRESS**

Model 200 self-contained hydraulic suitable for iron, steel, or nonferrous borings and turnings. Complete with 220-440 motors and starters, pumps, tampers, feeder. Will produce a 3 lb. briquette 70-80% dense at rated capacity of about 2 tons per hour. May be seen in operation and test run. Address: Box 571, FOUNDRY, Cleveland 13, Ohio.

# CLASSIFIED ADVERTISING

## Employment Service

**EMPLOYMENT COUNSEL, INC.**
"All The Name Implies"
JOHN COPE, Manager Foundry Dept.

Recruiting men for employers in the foundry industry throughout the nation. Openings in Steel, Malleable, Gray Iron and Non-Ferrous—Jobbing and Production. Salaries to $20,000.

PLANT MANAGERS — SUPERINTENDENTS
GENERAL FOREMEN — MOLD FOREMEN
CORE FOREMEN — MELTING FOREMEN
CLEANING FOREMEN — MAINTENANCE FOREMEN
PATTERN FOREMEN — METALLURGISTS
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And all other Administrative and Sales Positions
WRITE or CALL for registration.
Completely Confidential.

**SUITE 500**
**CHICAGO 2, ILLINOIS**

**7 WEST MADISON ST.,**
**FINANCIAL 6-2100**

**SALARIED PERSONNEL**

**$3,000-$25,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring if employed full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.**

## For Sale

**FOR SALE**
**BY**
**MOORE PLOW AND IMPLEMENT COMPANY**
**GREENVILLE, MICHIGAN**

1—Wheelabrator Tumblast, size 36 x 42, Serial A63288

10—Haynes Jolt Squeezers

3—Milwaukee Jolt Squeezers

1—74/50 A.M. Sand Cutter, Serial 150

1—Rotoclone for wheelabrator, wet, serial N51071 #2½, Type N, ¼ H.P. ejector motor & 10 H.P. for fan, 2300 CFM, 220V, 60 cycle

1—Rotoclone for tumblers, wet, serial N651097, #2, Type N, ¼ H.P. for fan, 2562 CFM, 220V, 60 cycle

1—Rotoclone #12, Type D, dry, Serial D51235, 7½ H.P., 220V, 60 cycle, for grinders

1—Large Brinell Machine

1—E3245 Despatch core oven, serial 29605, gas fired, drawer type

1—Porbeck C-3C drawer type, gas fired core oven
Large quantity of jobbing flasks, all sizes
Large quantity of Hines, Fremont & Stripper flasks, all sizes, nearly new

3—36 x 60 Whiting RB exhaust tumblers, w/R.B. clutch

6—Drill Presses

2—Redford #2 Core Blowers, Serial #2-110-230

1—International Rollover Machine
Complete Grinding Room Equipment

1—P&H 2 ton electric hoist, new
Quantity of air tools

85—Shop trucks
Complete office equipment
Large quantity of other items, too numerous to mention

We are offering our foundry with 20 tons per day capacity and real estate, property completely fenced in and on Grand Trunk siding.

**WRITE-CALL OR WIRE**
**MOORE PLOW & IMPLEMENT COMPANY**
**GREENVILLE, MICHIGAN**
**PHONE 225**

## For Sale

**FOR SALE**

6—Osborn #2047 Jolt Rollovers; 600 lbs. capacity 1943 Machines, Excellent Condition.
1—SPO Jolt Strip Squeeze Machine, 1948 A-1
1—Osborn 814-P, Jolt Strip Squeeze, Excellent.
1—Osborn 405 Rollover, Good Condition.
4—Champion Pin-Lifts Size 42-6, A-1 Condition.
1—International Pin Lift, 42-6, A-1 Condition.
1—American Sand Cutter, size 69 x 45, Model AM, 1945, Good Condition.
2—Vaporfiers #5, Ser. #320 and 321. Mfg. Vaporfier Corp. Good Condition.
1—Osborn #275-J Jolt Squeeze Molding Machine, Ser. #77037, A-1 condition.
1—Johnson & Jennings Jolt Squeeze Molding Machine, Ser. #20873194.
2—Simplicity Shakeouts, 3' x 3', new in 1948.
1—Simplicity Shakeout, 3' x 5', new in 1948.
2—Spencer 5400 C.F.M. 16 oz. 40 H.P. Motor.
1—Rheile Tester 100,000 lbs. Screw Type.
1—Rheile Tester 150,000 lbs. Screw Type.
1—Howe Platform Scale 4000# 4' x 5' Electric.
3—Tilting Furnaces, 800 lbs. capacity, Alum.
3—Holding Furnaces, 300 lbs. capacity, Alum.
1—Bradley Hammer, 10 H.P. Motor, 1945.
1—G.E. Battery Charger, M.G. Set, NEW.
2—Gardner-Denver air compressors, 2 stage, 6 cylinder, water cooled, 455 CFM, 140 lbs. PSI, 93.7 B.H.P. with inter-cooler, one unused, one used with spare parts for rebuilding.
1—Beardsley & Piper Model S Screenerator. Portable.

LIFT TRUCKS
1—Clark Fork Lift Truck, 6000 lbs. 108" Lift.
1—Towmotor Fork Lift Truck, 5000 lbs. 9' Lift.
1—Automatic Platform Lift Truck, 5' Lift, 3000 lb. Electric, 1946 Machine, Excellent.
5—Lewis-Shepard Jack Lift Trucks, 4000 lbs. capacity, Hydraulic, New in 1950, A-1 Shape.
1—Towmotor Fork Lift Truck, 3,000 lbs. 7' lift. 1946 machine. Used very little. A-1.
HOISTS, AIR: ELECTRICAL: MECHANICAL,
4—Small Ingersoll Air Hoists 1,000 lb. cap.
3—P.H. Electric Hoists, 2,000 lb. cap. 220/440 60 cycle, 3 phase.
LARGE ASSORTMENT OF HINES ALUMINUM POP OFF FLASKS AND JACKETS, STEEL FLASKS: VARIOUS ALUMINUM & TRANSITE CORE PLATES. EQUIPMENT LISTS AVAILABLE ON REQUEST.

**A.A.A. MACHINERY & EQUIPMENT CO.**
**856 EDDY ROAD — CLEVELAND 8, OHIO**

**FOR SALE**

**DREVER SALT BATH FURNACE**

Bath Size 12' x 4' x 7' depth Radiant Tube Gas Fired Complete with North American Blower and Leeds & Northrup Automatic Recording Temperature Control. Maximum Operating Temperature 1250° F.

Suitable for Salt Desanding or Stainless Cleaning.

**CARDINAL STEEL SUPPLY**
**2695 E. 79TH**
**CLEVELAND 4, OHIO**

**FOR SALE**

10" x 30" Roots Connersville blower. Price: $800.00. Address: Box 592, FOUNDRY, Cleveland 13, Ohio.

## For Sale

**FOR SALE**

**17,000 FT.**

**#458 OVERHEAD CHAIN CONVEYOR**

any part

Jervis B. Webb—Link Belt—Saginaw

**Trolleys—Attachments—Curves,**

**Take Ups—Hooks—4" I Beam, etc.**

Like New & Used—Excellent cond.—Latest Type.

**Save Up to 65% of New Cost.**

This Conveyor just removed from former Lustron Co., Columbus, O.

**ALLIED MATERIALS HANDLING CO.**
**4657 SPRING GROVE**
**CINCINNATI 32, OHIO**

**FOR SALE**

SAND DRYER AND COOLER, Bartlett & Snow rotary, 54" cylinder, 12' length, complete.
2 APRON CONVEYORS, under storage hopper type, 36" wide, 13' centers. Complete with 7½ H.P. motors, Link Belt reducer.

Equipment practically new
Engineering change eliminates use.

**ILLINOIS FOUNDRY COMPANY**
**SPRINGFIELD, ILLINOIS**

**FOR SALE**

GRAVES-KLAUSMAN GAP LATHE
18" x 36" x 10' Bed with Center Rests. 8 Spindle Speeds—With Electric Motor. Purchased in 1951—Not Used ..... $2000.00

**THE TREATY COMPANY**
**MANUFACTURING DEPT.**
**GREENVILLE, OHIO**

**FOUNDRY EQUIPMENT FOR SALE**

2—Tilting 650 lb. melting furnaces—gas fired with blowers and hoods and one new lining ..... $1000 ea. complete
1—3 ton electric hoist with 30' I beam trolleys, controls, cable reel..... $900
1—Acme 32" heavy duty vertical band saw with internal motor ..... $250

**SAGINAW BAY INDUSTRIES, INC.**
**242 N. WATER STREET BAY CITY, MICHIGAN**

**FOR SALE**

1—Type L-G 5 Pangborn Automatic Multi-Spindle Rotoblast Table Cleaning Machine with 28" extra height clearance, motors and controls. Good Condition.

**BOX 560**
**FOUNDRY — CLEVELAND 13, OHIO**

**FOR SALE**

American Sandcutter, Model AM, Size 69/45, Serial #205: 220/440 Volt; in excellent working condition. Machine available immediately, complete with 70 ft. of cable and two outlet receptacles. Address all inquiries to: **KEUTHAN FOUNDRY DIVISION, THE BLACK-CLAWSON COMPANY, MIDDLETOWN, OHIO. PHONE: 2-8861.**

**FOR SALE**

One 100 KW Westinghouse transformer, 22000 volt primary 115-230 volt, three wire secondary. Address: **FORT PITT STEEL CASTING DIVISION, MC KEESPORT, PA.**

# For Sale

**FOR SALE**

**SAND BLAST EQUIPMENT**

Wheelabrators-Tumblast size 48 x 42. $3000.00 to $4000.00.
Wheelabrator size 48 x 48. Like new. $5250.00.
Wheelabrator Tumblast 36 x 42. $4500.00.
Sly-master Blast size 36 x 42. Good condition.
Pangborn ES-207 Blast Cleaning Cabinet used for Strip steel or bar stock. $1750.00.
Sand Blast Cabinets, pressure tanks, dust collectors and blowers. All sizes.
Contact us for your sandblasting needs or any surplus sandblasting parts and equipment you have for sale.
Will accept your small machines as trade in on any of the above equipment.

**DIAMOND SAND BLAST, INC.**
**5654 WEST JEFFERSON**
**DETROIT 9, MICHIGAN**

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**FOR SALE**

Motors, Generators, Transformers from 1 HP to 2500 HP
World headquarters for T.E.F.C. and explosion proof motors.
World's largest inventory.

**ELECTRIC EQUIPMENT CO.**
**ROCHESTER, N. Y.**

---

**TESTING MACHINES**

1—Riehle 400,000# hydraulic and beam type Compression Testing Machine
1—Riehle 200,000# Universal
2—Riehle 100,000# Universal
1—T. Olson 100,000#
Also Simpson Sand Mixers, #0, #1, #1½, #2, #3
Miscellaneous: Screens, Pulverizers, Grinders, Conveyors—all types, Tyler Rotap Screens, etc.

OUR 36th YEAR

**CONSOLIDATED PRODUCTS CO., INC.**
**13-20 PARK ROW NEW YORK 38, N. Y.**
**TELEPHONE: BARCLAY 7-0600**

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**FOR SALE**

Tabor Pneumatic Molding Machines, 10" Squeeze .....Price $ 110.00
Osborn Molding Machine, Portable, #74 .....Price $ 100.00
Adams Portable Hand Squeeze Molding Machines, 13" .....Price $ 55.00
Wheelabrator Table #2 with 8-24" Multitables .....Price $2600.00

**M. ELSTEIN**
**141 MANGIN STREET**
**NEW YORK 2, NEW YORK**

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**FOR SALE**

**ALL EQUIPMENT OF GRAY IRON FOUNDRY INCLUDES**

No. 3 Cupola
Adams Molding Machines
Adams & Hines Flasks
Demmler No. 55 Core Blower
Tumbling Mill
Outdoor Truck Scales
Air Compressor
Sand Testing Equipment
Other Miscellaneous Items

**DES MOINES FURNACE & STOVE REPAIR CO.**
**DES MOINES IOWA**

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**PRICED RIGHT FOR QUICK SALE**

BUSCH SPRUE CUTTER, heavy duty for steel, 8" throat, capacity 1¾" square, 2½" round, equipped with 7½ HP, AC motor.
ROLLER CONVEYOR, approximately 500' BP, 10' lengths, 2" diameter rollers, 8" centers, rollers above angles.
INTERNATIONAL CORE BLOWER #SB11, 15" x 24" Table.
MILWAUKEE ELECTRIC HOIST 1 ton capacity, 2 motors, motorized trolley, 10' lift.

**GLOBE MACHINERY CO.**
**602 W. LAKE STREET, CHICAGO 6, ILLINOIS**
**ANDOVER 3-4185**

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**FOR SALE**

1—Ingersoll Rand motor blower 16 oz., 1500 CFM, with 10 HP, 3500 RPM, 220-3-60 motor. New 1945, excellent condition. Address:

**BARNETT FOUNDRY & MACHINE CO., IRVINGTON 11, N. J.**

# For Sale

**FURNACE TRANSFORMERS**

5000 KVA—WESTINGHOUSE H. T., 13200/13200 V., LT-225/150 V. and 130/86 V. 3 Ph. 60 Cy. 940 KVA H. T. Reactor, Automatic Arc Regulator, Control.

4000 KVA—PENNSYLVANIA, H, T. 13200/13200 V., LT 239/147 V. and 130/86 V. 3 PH. 60 Cy. Built in Reactor.

125 KW—KUHLMAN, HT 2200 V., LT 90 V. Single Ph. 60 Cy.

**DELL STEPHENSON & CO.**
**14456 GLASTONBURY**
**DETROIT 23, MICHIGAN**
**TEL: VERMONT 5-0697**

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**FOR SALE**

1—Redford bench type core blower
1—Royer sand blender, Model NC-2
1—Pangborn sand dryer gas burner
1—International H.J. 16 x 4 machine
1—Rightway pedestal grinder
1—Osborn J-275 jolt squeezer

**BOX 586**
**FOUNDRY CLEVELAND 13, OHIO**

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**FOR SALE**

1—#3 American Wheelabrator 4-48 inch tables, extra high clearance.
1—#1 Pangborn Rotoblast 12-17 inch tables.

**The RELIABLE BARREL COMPANY**
**2518 BROADWAY AVENUE**
**CLEVELAND, OHIO**
**MAIN 1-3165**

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**CLOSING OUT—MOLDING MACHINES**

15—Model 2047-3 Osborn Jolt Rollover Pattern Draw molding machines. New in 1943. Replacement cost, about $3,500.00.
OUR PRICE ..... $275.00

**BALCHER MACHINERY COMPANY**
**1884 S. COMPTON ROAD**
**CLEVELAND HEIGHTS 18, OHIO**
**TELEPHONE: FAIRMOUNT 1-1186**

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**FOR SALE**

One (1) Model 2C American Wheelabrator Suction Blast Cabinet. One (1) #2 Model 70 B Dust Collector. Like new and unused condition, complete with all accessories. Best offer accepted. Address: **ELECTRIC HEATING EQUIPMENT COMPANY, 26 S. 32nd STREET, PHILADELPHIA 4, PENNSYLVANIA.**

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**FOR SALE**

Forty foot motorized Cleveland Tramrail Crane with 2,000 lb. capacity, 5 speed electric hoist. Conductors included by no track. Address: **LA PORTE FOUNDRY COMPANY, LAPORTE, INDIANA.**

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**FOR SALE**
**TURBO BLOWERS WITH MOTORS**

| CFM | PRESS. | MAKE | CFM | PRESS. | MAKE |
|---|---|---|---|---|---|
| 6750 | 24 oz. | Spencer | 800 | 8 oz. | No. Am. |
| 4500 | 16 oz. | G.E. | 675 | 16 oz. | Spencer |
| 4000 | 42 oz. | Spencer | 660 | 20 oz. | A-B |
| 3500 | 40 oz. | Spencer | 500 | 10 oz. | No. Am. |
| 2800 | 1 oz. | Spencer | 400 | 4.3 oz. | Spencer |
| 2700 | 16 oz. | No. Am. | 340 | 20 oz. | A-B |
| 2700 | 16 oz. | Spencer | 320 | 12 oz. | Spencer |
| 2500 | 7 oz. | Sturt. | 225 | 16 oz. | Spencer |
| 2200 | 16 oz. | No. Am. | 180 | 15 oz. | Spencer |
| 2000 | 2½ oz. | Spencer | 9100 | 7" SP | Sturt. |
| 2000 | 1 oz. | Spencer | 1100 | 4½" SP | Bayley |
| 1150 | 20 oz. | No. Am. | 100 | 7" SP | Spencer |
| 1000 | 12 oz. | No. Am. | | | |

**THE MOTOR REPAIR & MFG. CO.**
**1552 HAMILTON AVE.**
**CLEVELAND 14, OHIO**

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**FOR SALE**

1—American sand cutter, Style AM, Size #74/50, Serial #224. Excellent condition. If interested write: **CLINTON MACHINE CO., MAQUOKETA, IOWA, C/O CHARLES SCHOFIELD.**

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**FOR SALE**

Lectromelt 500 lb. UT top charge furnace. Little used. Address: Box 504, FOUNDRY, Cleveland 13, Ohio.

# For Sale

**FOR SALE**

2—Mechanized Sand Systems.

**MELTING EQUIPMENT**

2—#8 Whiting Cupolas chargers and centrifugal blowers.
1—Fisher 100 Gas Fired Tilting Furnace.
1—Strohman Aluminum furnace—350# cap., stationary.
7—Monarch Furnaces with blowers — barrel type—#94.

**BLOWERS**

1—Allis Chalmers Turbo Blower—8500 CFM at 1.5# pressure.
1—Spencer Turbo Blower—15 HP—1750 RPM—1350 CFM at 24 oz.
2—48" Blowers—20 HP—Low Pressure.
1—North American 10 HP—1300 CFM at 16 oz.
1—North American 4 HP.
3—North American 5 HP—600 CFM at 16 oz.
1—General Electric 30 HP Blower—5700 CFM at ¾ # pressure.
1—Rotoclone Type "D"—Size 10W.

**AIR COMPRESSORS**

1—Sullivan 40 HP Air Compressor.

**SAND HANDLING**

1—Wheelabrator—36 x 42.
1—Tractor Sand Slinger, 16" head.
1—Mobile Sand Slinger—300 cu. ft. tank.
1—Rotary Oil Fired Sand Dryer—42" x 20' long.
1—Model "M" Screenerator.
Tumbling Barrels, Round and Square.
12—Hydraulic Lift Trucks, all sizes.

**MOLDING MACHINES**

14—Osborn 275J Portable Molding Machines.
2—28A Davenport Rollovers.
1—4' No. 1 Simpson Mixer.
1—Johnston & Jennings 683 Jolt Stripper.
125 Machines in stock. All types.
8—Core Ovens. All types.
10 & 15 Ton Bottom Pour Ladles.
16—1000 & 1500# Worm Geared Ladles.
100 Tons Steel Flasks, core plates, small flasks. Send for lists. Largest stock of used foundry equipment in the United States.

**UNIVERSAL MACHINERY & EQUIPMENT CO.**
**320 E. BROAD STREET**
**SHILLINGTON, PENNSYLVANIA**
**PHONES—READING—30311—40146**
**R. B. HARRISON, MGR., FDRY. DIV.**

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**FOR SALE**

One new No. 217-13E Milwaukee Jolt Squeeze Rollover Draw Molding Machine. This machine has never been used and is on the original skids just as received from the factory.
Price ..... $7954.00

**NEW HAVEN FOUNDRY**
**NEW HAVEN, MICHIGAN**

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**FOR SALE**

1—International Type PK Jolt Squeeze Pin Lift, 18" Cylinder, 8" Lift.

**RAY P. SCULLY**
**SCULLY MACHINERY & EQUIPMENT CO.**
**767 MILWAUKEE AVE. CHICAGO 22, ILL.**
**PHONE: CANAL 6-0314**

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**FOR SALE**

Bankrupt lot of foundry type pneumatic tools at real savings.
Master chipping hammers size #2 hex. bushings .....$ 80.00
Model 606 Master hor. grinders straight handle, 6,000 RPM .....$120.00
Model 605C Master cone grinders grip handle, 8,750 RPM .....$110.00
Model 610 Master grinders straight handle, 6,000 RPM .....$120.00
All tools guaranteed. In original factory cartons. Limited quantities.

**HAYNES EQUIPMENT CO., INC.**
**62 VOOHIS LANE HACKENSACK, N. J.**

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**PYRO OPTICAL PYROMETER FOR SALE**

One practically new and in excellent condition. New price: $265.00. Our price: $130.00. Address: Box 594, FOUNDRY, Cleveland 13, Ohio.

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**FURNACE FOR SALE**

1947 Model Oil Fired Stroman Sklenar Furnace, 400 pound capacity, for nonferrous melting. Oil type with air powered tilt. Address: Box 577, FOUNDRY, Cleveland 13, Ohio.

# CLASSIFIED ADVERTISING

## For Sale

YOUR CLASSIFIED ADVERTISEMENT IN FOUNDRY BRINGS RESULTS!

•

IF YOU ARE SEEKING A CHANGE OF POSITION TO BETTER YOUR SITUATION AND ARE QUALIFIED FOR A BETTER JOB, TELL THE 45,000 READERS OF FOUNDRY ABOUT IT.

•

DON'T "HIDE YOUR LIGHT UNDER A BUSHEL"—THERE ARE TIMES WHEN A MAN SHOULD TALK ABOUT HIMSELF AND THERE ARE A LOT OF MEN QUALIFIED FOR BETTER POSITIONS WHO DO NOT KNOW HOW TO GO ABOUT IT OR WHERE TO SEEK HIGHER RESPONSIBILITIES.

•

YOUR CLASSIFIED ADVERTISEMENT IN FOUNDRY WILL BE WIDELY READ AND THE RESULTS MAY SURPRISE YOU!

•

IT COSTS BUT LITTLE, WHY NOT RUN AN ADVERTISEMENT ABOUT YOURSELF IN TWO OR THREE ISSUES?

★ ★ ★

WRITE

FOUNDRY

CLASSIFIED ADVERTISING DEPT.

PENTON BLDG., CLEVELAND 13, OHIO

## For Sale

**FOR SALE**

MOLDING MACHINES

2—No. 275 Osborn jolt squeezers.
8—13 x 8 Tabor power squeeze flask lift machine split pattern type.
2—Deuscher Stationary jolt squeeze.
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers.
4—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.
2—International PKL 14"-5½" Jolt Squeeze Pin Lift.
1—Tabor Pedestal Core Rollover Hand Ram Rollover Draw 14 x 20 table 8" draw.

BLOWERS FOR CUPOLAS AND FURNACES

1—15 HP North American 2100 CFM at 16 ozs.
2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
10—High temperature blowers 1400° F. 9000 to 15000 C.F.M.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz Spencer Turbine Blowers.

METAL MELTING EQUIPMENT

1—1000# open flame brass melting furnaces, gas fired.
1—Hausfeld Stationary Brass, Multiple gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
New 32" to 41" dia. shell cupolas made to order.
New 1000 lb. aluminum cap. tilting crucible furnaces to specifications.

MISCELLANEOUS

1—Stoney crane type shakeout.
1—Dings type M magnetic separator.
1—NC-4 sand separator.
1—#1 Demmler core blower.
2—#16 Roto-clone units complete.
25 Tons steel flasks in sizes from 26 x 26 to 60 x 60.
1—McLeod Small Sand Blast Barrel 24 x 24.
1—36W Wet Type Roto-Clone 34000 CFM.
1—24W Wet Type Roto-Clone 13000 CFM.
Complete stock of rebuilt mill and dust exhaust blowers.
1—27 x 36 American wheelabrator, tumblast with rubber belt.

**CLIFTON MACHINERY COMPANY**
**1023 W. SIXTH ST. CINCINNATI 3, OHIO**

**FOR SALE**

AUTOMATIC 12 STATION BUFFING AND POLISHING MACHINE. Late Packermatic 2-12 Rotary Indexing Type. 5 10-HP Heads.

In operation.

**GREAT LAKES MACHINERY COMPANY**
**546 W. WASHINGTON STREET**
**CHICAGO 6, ILL.**
**TEL: FRANKLIN 2-1400**

**FOR SALE**

One—Hines Flask 18" x 24", 5" cope, 5" drag, 2" cope and drag upsets, 6 jackets 8" deep. LIKE NEW.

One—Hines Flask 20" x 20", 5" cope, 5" drag, 2" upset cope and drag, 5 jackets 8" deep. LIKE NEW.

**PHILLIPS FOUNDRY CO.**
**P.O. BOX 82 BAKERSFIELD, CALIFORNIA**

**FOR SALE**

1—Gas Pump—12" x 30", 2,000 cfm of gas against a discharge pressure of 3 lbs. when operating at a speed of 425 RPM. Under these conditions, the unit would require 36.8 BHP, with a V-Belt drive.

**CONTACT**
**MR. H. E. BATCHELOR**
**THE EASTERN MALLEABLE IRON CO.**
**P. O. BOX 349 WILMINGTON, DELAWARE**

**FOR SALE**

35 sets barred steel flasks
wall ⅜"
size 18" x 32" x 10"
pin centers 35"
Trunions and handles both Cope and Drag

**DETROIT GEAR DIVISION**
**BORG-WARNER CORPORATION**
**12345 KERCHEVAL AVENUE**
**DETROIT, MICHIGAN**
**TEL. VALLEY 2-4530**
**(Purchasing Department)**

## For Sale

**FOUNDRY EQUIPMENT**

**MOLDING EQUIPMENT**

**Herman Jolt Rollover #6000, 40" x 60", 1947**
**2—Herman Jolt Stripper, 48" x 54", 1947**
Osborn Jolt Roll Over, model 405S, with Roll out Car 44" x 48"
Champion Stripper, 36" x 48" x 8", 1947
4—275J Osborns—late type
1—SPO Squeezer
2—276J Osborns—late type
1—444 Osborn Rollover—late type

**MOLD HANDLING & SHAKEOUT EQUIPMENT**

Stoney Double Jolt Knockout
Productive Shakeout 6 x 8
900 ft. 10" Logan Roller Conveyor 3½" dia
Jeffery Powered Wood Slat Conveyor

**SAND HANDLING EQUIPMENT**

Unit A Syntron Feeder Hopper, 6' x 6'
2—Aerator, Overshot type, 9' x 2' & 4' x 3'
Aetna Sperser System
Simplicity Shaker, model C
Steel Hopper System
1—6' x 7' x 3'6"
1—12' x 7' x 3'6"
5—4'6" x 4'6" x 1'

**CRANES & HOISTS**

15—Curtis Traveling Bridges, 15' span
16—Curtis Air Hoist, 5 & 6" Cylinders, 3½' x 4' Lifts

**CUPOLA & LADLE EQUIPMENT**

Roots-Connersville Blower, 14 x 36, 30 hp., late
Roots Connersville Blower, 22 x 66, 75 hp
Roots Connersville Blower, 12 x 30, 20 hp
Geared Ladies
Spencer Turbo Blowers, 2250 cfm @ 16 oz—2850 @ 16 oz.

**MISC. FOUNDRY EQPT.**

Demmler #1 Core Blower
American Sand Cutter, model AA
Baker Lift Truck, 6000# cap., 1948
Logan Wood Slat Conveyor, motorized, 36" x 35' Roller Conveyor
7—18" Pedestal Grinders
**Tons of Flasks 12 x 18 to 48 x 120**
**Core Blower, Champion, model CB400, 300 lb.**
**Gogan Brinell Testing Machine, Stationary, Floor type, model 2133, table 27½" x 24" x 7" high.**
Roto-Clone units, 24W & 36W, with sludge ejectors
Vibrators, Osborn, 1⅝" x 2"
Welded Steel Pouring Crucibles, new, 1700#
Bottom Dump, Sand Buggies
Exhaust Fans—to 60"
Fire Extinguishers—CO2
Exhaust Blowers—all sizes

WE WILL BUY—FROM 1 PIECE UP TO ENTIRE FOUNDRY.

**ALLIED MATERIALS HANDLING CO.**
**4657 SPRING GROVE AVE.**
**CINCINNATI 32, O.**
**PHONE: MU 5465**

# FOR SALE

**Molding Machines**

3—#2166 Spo Jolt Squeeze Pin Lift
4—#814-P Osborn Jolt Squeeze Pin Lift
1—6000# Herman Rollover, Jolt and Pattern Draw 42″ x 90″
1—#405 Osborn Jolt Rollover and Pattern Draw
5—#601-13 Osborn Jolt Rollover and Pattern Draw
4—#2047-4 Osborn Jolt Rollover and Pattern Draw for cylinder head core production
1—30″ x 40″ Tabor Jolt Rollover and Pattern Draw, 1000#, 12″ draw
1—SA-34 Davenport Jolt Rollover and Pattern Draw, 2500# jolt cap., 15″ draw, 34″ x 48″ table, flask 36″ x 64″
1—SA-28 Davenport Jolt Rollover and Pattern Draw, 1500# jolt cap., 12″ draw, table 30″ x 40″
1—34-A-JS Davenport Jolt Pin Lift, 2500# cap. 12″ draw, 36″ x 46″ table
5—Champion Draw Power Pushoff Machines 10″ draw, 38″ x 40″ table
4—International Type JFL Jolt Ram, Foot-lever Pin Lift.

**Core Room Equipment**

1—#1 Demmler Core Blower
6—#92 Osborn Core Blower
1—20″ Paddle type sand mixer
2—#3 Simpson Mullers
3—#2 Simpson Mullers
2—#70 Beardsley-Piper Mullers
1—Revolving Core Conveyor Table
1—Link-Belt Core Breaker Drum approx. 6′ x 10′
Various sizes transite core plates

**Cleaning and Grinding**

2—Fin Cleaning Machines for cleaning cylinder heads
1—3 H.P. double stand grinder—flat belt drive 220/440/3/60
1—10 H.P. double stand grinder — direct connected 220/440/3/60
3—7½ H.P. double stand grinders—direct connected 220/440/3/60

**Misc. Foundry Equipment**

1—4′ x 10′ Robbins Shake-out with 7½ H.P. motor 220/440/3/60.
1—4′ x 6′ Simplicity Shake-out, Model D, 1600# cap. 10 H.P. 220/3/60.
1—500# Hausfeld hand tilt furnace
3—Stationary Sand Slingers—Beardsley-Piper
2—#3 Jeffrey Vibrators for Shakeout
4—#4 Jeffrey Vibrators for Shakeout
1—50 H.P. Spencer Turbine Cupola Blower 16 oz. 220/440/3/60.
1—20 H.P. North American Turbine Blower 24 oz. 220/440/3/60.
2—3 H.P. Blowers for furnaces 16 oz. 220/440/3/60.
1—Pig Mold Conveyor (Link-Belt) 74′ lg. complete with drive for aluminum and magnesium.
2—1000 Gals. p. min. Centrifugal Pumps, Ingersoll-Rand, 52 ft. head, 5″ suction, 4″ discharge, dir. connected to 20 H.P. 220/440/3/60, Rebuilt.
Various sizes steel flasks, Hines Popoff flasks and jackets.

**EUCLID FOUNDRY & MACHINE EQUIPMENT CO.**

15019 Saranac Rd., Cleveland 10, Ohio — Telephone—GLenville 1-1538

# CLASSIFIED ADVERTISING RATES

**POSITION WANTED** — Minimum advertisement set solid, 30 words or less, $3.00. Additional words 10c each.

**ALL OTHERS**—"Help Wanted"—"For Sale"—"Wanted"—"Personals"—"Services", etc., minimum advertisement set solid, 30 words or less, $6.00. Additional words 20c each.

**NOTE**—If replies are to be sent to a box number in care of FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

**INCH RATES PER INSERTION**

| Single Column 2¼″ Wide | One Time | Three Times | Six Times | Twelve Times |
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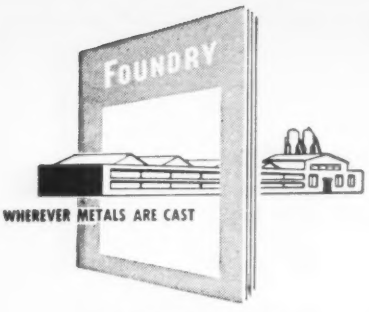
*Classified Forms Close the 13th of Month Preceding Issue*

**FOUNDRY**

PENTON BUILDING • CLEVELAND 13, OHIO





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# ADVERTISING INDEX


A

Abrasive Shot & Grit Co., Inc. ..... 82
Accurate Match Plate Co. ..... 131
Acheson Colloids Co. ..... 152
Acme Foundry Co. ..... 266
Adams Co., The ..... 188
Aimes Co., Inc. ..... 274
Ajax Electric Co., Inc. ..... 221
Ajax Electric Furnace Corp. ..... 221
Ajax Electrometallurgical Corp. ..... 221
Ajax Electrothermic Corp. ..... 221
Ajax Engineering Corp. ..... 221
Ajax Flexible Coupling Co., Inc. ..... 179
Alabama By-Products Corp. ..... 261
Allied Chemical & Dye Corp., Semet-Solvay Div. ..... 256
Allis-Chalmers ..... 69, 79
Allis-Chalmers, Tractor Div. ..... 15
Alloy Metal Abrasive Co. ..... 273
Alvin Products, Inc. ..... 278
American Air Filter Co., Inc., Herman Nelson Div. ..... 268
American Chain & Cable, American Chain Div. ..... 227
American Chain Div., American Chain & Cable ..... 227
American Lacquer Solvents Co. ..... 269
American MonoRail Co., The ..... 127
American Optical Co., Safety Products Div. ..... 24
American Silica Sand Co. ..... 135
American Smelting & Refining Co. ..... 281
American Smelting & Refining Co., Federated Metals Div. ..... 184
American Wheelabrator & Equipment Corp. ..... 30, 31, 125, 142, 143, 231
Apex Smelting Co. ..... 123
Arcair Co. ..... 281
Archer-Daniels-Midland Co., Foundry Products Div. ..... 4, 5
Automotive Pattern Co. ..... 234

B

Babcock & Wilcox Co., The, Refractories Div. ..... 55
Bakelite Co., A Div. of Union Carbide & Carbon Corp. ..... 13
Baldor Electric Co. ..... 290
Barber-Greene ..... 280
Baroid Sales Div., National Lead Co. ..... 185
Bartlett, C. O., & Snow Co., The ..... Back Cover
Bassichis Co., The ..... 281
Bay State Abrasive Products Co. ..... 194, 195
Beardsley & Piper Div. of Pettibone Mulliken Corp. ..... 149, 150, 191, 192
Bell, M. A., Co. ..... 243
Birmingham Committee of 100 ..... 59
Black, Sivalls & Bryson, Inc. ..... 60
Blastcrete Equipment Co., Inc. ..... 291
Blaw-Knox Div. of Blaw-Knox Co. ..... 267
Borden Co., The, Chemical Div. ..... 253
Bowser, Inc. ..... 256
Bradley Washfountain Co. ..... 247
Brummeler Steel Products Corp. ..... 278
Buehler Ltd. ..... 268
Buffalo Forge Co. ..... 22
Buffalo Pattern Works, Inc. ..... 63
Burdett Mfg. Co. ..... 279
Butler Bin Co., Carscoop Div. ..... 83

C

Campbell-Hausfeld Co., The ..... 246
Canton Products ..... 270
Carborundum Co., The ..... Inside Front Cover, 141, 264
Carl-Mayer Corp., The ..... 23
Carman, Edwin S., Inc. ..... 277
Cast-Master, Inc. ..... 269
Centrifugal Casting Machine Co. ..... 139
Chicago Eye Shield Co. ..... 245
Chisholm-Moore Hoist Corp. ..... 193
Christiansen Corp. ..... 219
Cities Service Oil Co. ..... 65
Clark Equipment Co., Industrial Truck Div. ..... 252
Clearfield Machine Co. ..... 52
Cleco Div. of The Reed Roller Bit Co. ..... 240
Cleveland Chaplet & Mfg. Co. ..... 268
Cleveland Crane & Engineering Co., The Cleveland Tramrail Div. ..... 25
Cleveland Flux Co., The ..... 129
Cleveland Metal Abrasive Co., The ..... 132
Cleveland Quarries Co., The, The Sterling Abrasives Div. ..... 36, 37
Cleveland Tramrail Div., The Cleveland Crane & Engineering Co. ..... 25
Columbia-Southern Chemical Corp. ..... 271
Columbus McKinnon Chain Corp. ..... 193
Corn Products & Refining Co. ..... 281
Crobaugh, Frank L., Co. ..... 269

D

Daniels, C. R., Inc. ..... 277
Davenport Machine & Foundry Co. ..... 29
Dayton Pneumatic Tool Co. ..... 279
DeBardeleben Coal Corp. ..... 274
Delta Oil Products Co. ..... 72
Demmler, Wm., & Bros. ..... 197
Detroit Electric Furnace Div., Kuhlman Electric Co. ..... 35
Detroit Testing Machine Co. ..... 244
Dings Magnetic Separator Co. ..... 249
DoAll Co., The ..... 27
Dow Corning Corp. ..... 80
Durez Plastics & Chemicals, Inc. ..... 199

E

Eastern Clay Products Dept., International Minerals & Chemical Corp. ..... 207
Eastman Kodak Co., X-Ray Div. ..... 157
Eaton Chemical & Dyestuff Co. ..... 279
Electric Furnace Co., The ..... 264
Electro Metallurgical Co., A Div. of Union Carbide & Carbon Corp. ..... 78
Electro Refractories & Abrasives Corp. ..... 239
Empire Varnish Co., The, Waterlox Div. ..... 273

F

Fanner Mfg. Co., The ..... 171
Federal Foundry Supply Co., The ..... 2, 46, 47, 177
Federated Metals Div., American Smelting & Refining Co. ..... 184
Flexible Steel Lacing Co. ..... 265
Fly Ash Arrestor Corp., The ..... 39
Foundry Equipment Co., The ..... 14
Foundry Services, Inc. ..... 254
Fremont Flask Co., The ..... 74
Fuller Co. ..... 21

G

Gardner-Denver Co. ..... 233

# INDEX


General Electric Co., X-Ray Dept. ..... 54
Girdler Corp., The ..... 173
Gordon, Claud S., Co. ..... 213
Great Western Mfg. Co. ..... 257

H

Harbison-Walker Refractories Co. ..... 11
Harnischfeger Corp., Overhead Crane Div. ..... 180, 181
Harnischfeger Corp., Welding Div. ..... 212
Hauck Mfg. Co. ..... 266
Herman Pneumatic Machine Co. ..... 168, 169
Hickman, Williams & Co. ..... 263
Hines Flask Co., The ..... 50, 51
Homer Mfg. Co., Inc., The ..... 269
Hough, Frank G., Co., The ..... 41
Houghton, E. F., & Co. ..... 19
Hydro-Blast Corp. ..... 215

I

Imperial Belting Co. ..... 10
Industrial Equipment Co. ..... 42
Industrial Metal Abrasives Co. ..... 218
International Graphite & Electrode Div., Speer Carbon Co. ..... 48
International Minerals & Chemical Corp., Eastern Clay Products Dept. ..... 207
International Molding Machine Co. ..... 187
International Nickel Co., Inc., The ..... 1
Iowa Mfg. Co. ..... 258
Ironton Fire Brick Co., The ..... 49

J

Jeffrey Mfg. Co., The ..... 75
Jobbins, William F., Inc. ..... 211
Johns-Manville ..... 232
Johnston Mfg. Co. ..... 258

K

Keller Tool Co. ..... 198
Knight, Lester B., & Associates ..... 56
Kuhlman Electric Co., Detroit Electric Furnace Div. ..... 35

L

Laboratory Equipment Corp. ..... 280
Lanly Co., The ..... 26
Lavin, R., & Sons, Inc. ..... 40
Libbey-Owens-Ford Glass Co., Plaskon Div. ..... 7
Lindberg Engineering Co., Lindberg-Fisher Div. ..... 175
Lindberg-Fisher, A Div. of Lindberg Engineering Co. ..... 175
Link-Belt Co. ..... 53

Mc

McDonald, B. F., Co. ..... 262

M

Manhattan Rubber Div. ..... 28
Manning, Maxwell & Moore, Inc. ..... 210
Master Pneumatic Tool Co., Inc., The ..... 271
Mathews Conveyer Co. ..... 147
Maughlin, H. P., Co., The ..... 272
Metal Blast, Inc. ..... 137
Mid-West Abrasives Co. ..... 145
Milwaukee Chaplet & Mfg. Co. ..... 214
Mine Safety Appliances Co. ..... 238
Modern Equipment Co. ..... 292
Muller Machinery Co., Inc. ..... 271
Mullite Refractories Co., The ..... 235
Multipack, Inc., Multiplex Machinery Co., Div. ..... 274
Multiplex Machinery Co., Div. of Multipack, Inc. ..... 274
Murphy, Jas. A., & Co., Inc. ..... 270

N

National Carbon Co., A Div. of Union Carbide & Carbon Corp. ..... 121
National Engineering Co. ..... 16, 17
National Lead Co., Baroid Sales Div. ..... 185
National Lead Co., Titanium Alloy Mfg. Div. ..... 71
National Pigment Co., Inc. ..... 76, 77
Neff & Fry Co., The ..... 234
Nelson, Herman, Div., American Air Filter Co., Inc. ..... 268
Newaygo Engineering Co. ..... 161
Newcomb-Detroit ..... 273
Norton Co. ..... 8, 9, 43, 62

O

Ohio Electric Mfg. Co., The ..... 277
Ohio Ferro Alloys Corp. ..... 61
Oliver Machinery Co. ..... 275
Osborn Mfg. Co., The ..... 154, 155

P

Pangborn Corp. ..... 44, 45, 57
Pattern Matchplate Co. ..... 250
Penn Iron Works, Inc. ..... 275
Pettibone Mulliken Corp., Beardsley & Piper Div. ..... 149, 150, 191, 192
Philadelphia Coke Co. ..... 272
Pittsburgh Crushed Steel Co. ..... 189
Pittsburgh Lectromelt Furnace Corp. ..... 38
Pittsburgh Metals Purifying Co. ..... 216
Plaskon Div., Libbey-Owens-Ford Glass Co. ..... 7
Plaster Process Castings Co. ..... 250
Porcelain Products, Inc. ..... 275
Pressed Steel Co., The ..... 18
Pressed Steel Div., Republic Steel Corp. ..... 70
Producers Core Sand Corp. ..... 269
Propellair Div. of Robbins & Myers, Inc. ..... 272

R

Radium Chemical Co., Inc. ..... 244
Raybestos-Manhattan, Inc. ..... 28
Redford Iron & Equipment Co. ..... 228
Reed Roller Bit Co., The, Cleco Div. ..... 240
Republic Coal & Coke Co. ..... 276
Republic Steel Corp. ..... 70, 162
Republic Steel Corp., Pressed Steel Div. 70
Rice Pump & Machine Co. ..... 278
Robbins & Myers, Inc., Propellair Div. ..... 272
Rockwell, W. S., Co. ..... 236


Continued on Page 290

# Dear Reader:

***Many of you have told us you liked the attractive front cover on last month's Ford issue. Since it was a reproduction of an actual color photograph, special and rather elaborate printing technique was required. On the chance that it might interest you, we asked for and received an explanation on how it was done.***

Production Manager Dick Strnad says we started with a 7 x 10 Kodachrome print which was sent to the engraver who, in turn, prepared five separate and enlarged renditions of the photo in the form of metal plates or engravings. Each engraving was designed to print one of the five colors which were used on the cover—plus the lettering which was "stripped in" or "tooled out" of the appropriate metal plate. After many tedious hours of working with the engravings to "strengthen" the color a little here and "weaken" it there, they were ready for the printer.

First, the yellow was printed, then red, then blue, next No. 2 red (for the FOUNDRY masthead), and finally black. The green you see on the flasks is mostly yellow with a little blue added, the drum in the lower left-hand corner is a little yellow with a lot of blue. If you have a magnifying glass handy, look closely. You'll see what we mean. And, finally, the finished printing was sprayed with a thin coat of varnish which protects the inks and gives the cover the glossy appearance of a photograph.

FOUNDRY is printed in our own plant. If you'd like to see it in operation sometime, it can be arranged anytime you are in Cleveland.

**297,130**

We have a report from our "reprint department" stating that we supplied a total of 297,130 reprints of editorial and advertising pages last year. Type and cuts of feature articles are normally held intact for 60 days after publication, although we advise immediate action if you have any interest in obtaining quantity orders of editorial content in reprint form.

**We Love Salesmen**

We love salesmen! is the title of a booklet recently issued by the Standard Pressed Steel Co., Jenkintown, Pa. Vest-pocket in size and done with humorous cartoons in two colors, it is given to all salesmen calling on the purchasing department of this company. Among other things (map on how-to-get-there, where to

(*Continued on Page* 290)

(Continued from Page 289)

park, what door to enter), it lists generally what this company buys to produce its socket screws, locknuts, steel shop equipment, et cetera.

**Welcome to Penton**

Welcome folders to be found in the reception rooms of plants and general offices are common-place nowadays and a mighty good public relations gesture they are. If you are interested in your firm's goodwill rating, it is worth your checking to see if you have such a printed folder or booklet. They need not be fancy and not important that they be produced in tremendous volume (although distribution to your own employees is in order). Yes, FOUNDRY has its welcome folder. Jeanne Franklin, Business Staff, will send you one if you'll ask her.

**Where-To-Buy It**

*We have reprinted the Where-To-Buy Directory of products advertised in FOUNDRY as it appeared in the March issue. If you would like to have a copy or copies for reference, please ask Mary Jane Kimpel, Business Department, to send them.*

**Quiz**

How well versed are you on foundry industry statistics? Here are a few pertinent questions, the correct answers to which are upside-down-below:

1—What percent of durable goods require castings as end-products or component parts? A-20%, B-35%, C-65%, D-90%.

2—The value of annual castings production is approximately: A-$50,000,000,000, B-$5,000,000,000, C-$5,000,000, D-$500,000.

3—The number of foundries in the United States and Canada is approximately: A-60,000, B-16,000, C-6,000, D-3,600.

4—Castings production for all branches of the industry is (annually) about: A-35,000,000 tons, B-16,000,000 tons, C-11,000,000 tons, D-8,000,000 tons.

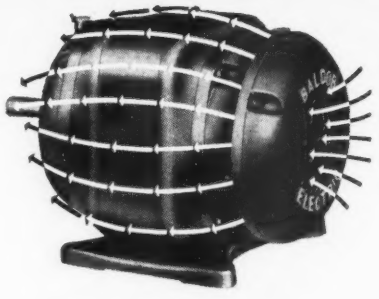
5—The 1953 Foundry Convention will be held in: A-Cleveland, B-Detroit, C-St. Louis, D-Chicago.

*F. A. Hoffa*

**Business Manager**

Answers: 1-D, 2-B, 3-C, 4-B, 5-D.


FOUNDRIES NEED THIS *Totally enclosed* MOTOR



*Arrows indicate the forced air movement over the entire exterior of the BALDOR STREAMCOOLED® motor frame.*

*The* BALDOR® STREAMCOOLED® *Motor*

These BALDOR ball-bearing motors are SOLIDLY ENCLOSED, cooled by an outer-mounted fan in the bell-end. They cannot inhale dirt, dust, grit or metal particles. BALDOR STREAMCOOLED Motors require no dismantling for cleaning. Thus less servicing—no interruption of production. Let us tell you more about these long service life BALDOR Motors (which are sold and serviced in more than 300 Trade Centers).

**BALDOR ELECTRIC CO.**
**4353 DUNCAN AVE. • ST. LOUIS 10, MO.**

Baldor

MOTOR SPECIALISTS FOR 30 YEARS



Roura Iron Works, Inc. ..... 277
Royer Foundry & Machine Co. ..... 119
Royersford Foundry & Machine Co. ..... 270

S

Schneible, Claud B., Co. ..... 32
Scientific Cast Products Corp., The ..... 254
Semet-Solvay Div., Allied Chemical & Dye Corp. ..... 256
Shanafelt Mfg. Co., The ..... 166
Shepard Niles Crane & Hoist Corp. ..... 237
Silent Hoist & Crane Co. ..... 230
Simonds Abrasive Co. ..... 12
Sly, W. W., Mfg. Co., The ..... 255
Smillie, C. M., & Co. ..... 213
Smith & Richardson Mfg. Co. ..... 276
Smith Oil & Refining Co. ..... 159
Smooth-On Mfg. Co. ..... 270
Sonken-Galamba Corp. ..... 230
Speer Carbon Co., International Graphite & Electrode Div. ..... 48
SPO, Inc. ..... 198, 204, 205
Standard Conveyor Co. ..... 248
Stearns Magnetic, Inc. ..... 6
Steel Shot & Grit Co. ..... 189
Sterling Abrasives Div., The, of The Cleveland Quarries Co. ..... 36, 37
Sterling Wheelbarrow Co. ..... 73, 84
Stevens, Frederic B., Inc. ..... Inside Back Cover
Surety Rubber Co., The ..... 276

T

Tabor Mfg. Co., The ..... 20
Tamms Industries, Inc. ..... 265, 280
Timken Roller Bearing Co., The ..... 81
Titanium Alloy Mfg. Div., National Lead Co. ..... 71
Toledo Matchplate Co. ..... 250
Tousey Varnish Co., The ..... 183
Tracerlab, Inc. ..... 266

U

Union Carbide & Carbon Corp., Bakelite Co. ..... 13
Union Carbide & Carbon Corp., Electro Metallurgical Co. ..... 78
Union Carbide & Carbon Corp., National Carbon Co. ..... 121
United Oil Mfg. Co. ..... 58
U. S. Industrial Gloves ..... 165
United States Rubber Co. ..... 165, 201
United States Safety Service Co. ..... 267
Universal Engineering Co. ..... 64
U. S. Reduction Co. ..... 66

V

Vanadium Corp. of America ..... 203
Viking Steel Co. ..... 267

W

Waterlox Div. of The Empire Varnish Co. 273
Wedron Silica Co. ..... 236
Wellman Bronze & Aluminum Co., The ..... 251
Wellman Engineering Co., The ..... 274
Western Metal Co. ..... 242
Westinghouse Electric Corp. ..... 224
Westover Engineers ..... 262
Whiting Corp. ..... 208, 209
Wickland, A. A., & Co. ..... 270

Y

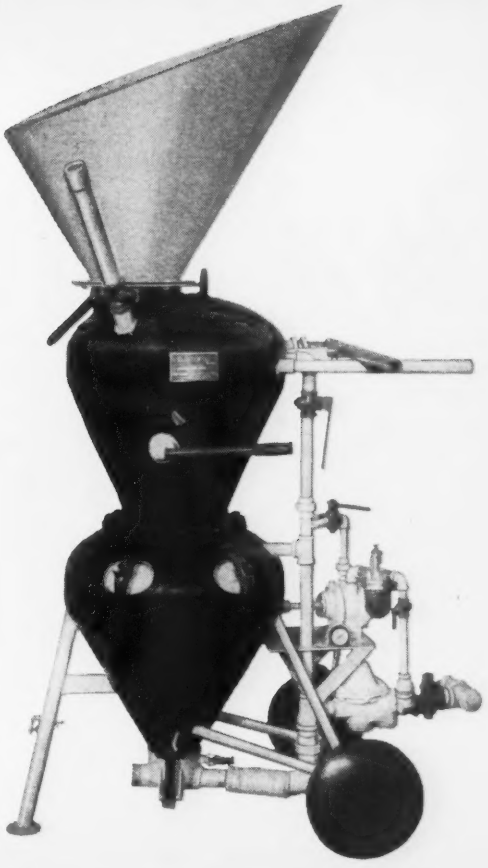
Yuba Mfg. Co. ..... 259

Table of Contents, Page 3

Classified Advertisers, 282, 283, 284, 285, 286, 287

# THE
# BLASTCRETE GUN

## FOR ALL TYPES OF REFRACTORIES AND CEMENTITIOUS MATERIALS



### 1. SIMPLE TO OPERATE AND MAINTAIN

Quick, easy access to feed mechanism for inspection. Rate of material flow easily and quickly adjusted while gun is in operation.

### 2. CONSTRUCTED TO MEET ASME REQUIREMENTS

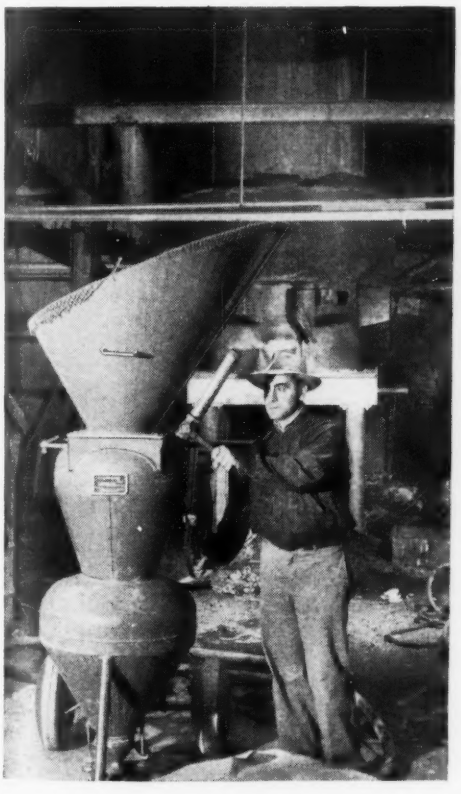
Meets insurance and safety requirements. Constructed according to the American Society of Mechanical Engineers Code covering pressure vessels.

### 3. VERSATILE

Places 1 to 5 cu. yds. per hr., or approximately 1¼ cu. yds. per hr. per 100 cfm of air. Efficient air motor requires but little air for operation.

Handles materials with up to 6% moisture. In many applications, the higher moisture content is desirable.

Handles all refractory materials and all cementitious materials for construction as well as many light weight aggregates.



CONSTANT, STEADY FLOW guaranteed on all types of refractories and cementitious materials, even with moisture content up to 6%, including rebounds.

This continuous action gun can be operated under normal conditions by a full crew of 2 men. Gun and Hopper capacity averages 1400 lbs. No additional overhead hoppers required.

Handles both acid and basic refractories—light and heavy.

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1206 Locust St.,
Philadelphia 7, Pa.

**MIDWEST DISTRIBUTOR**
The Pyro Refractory Co.
5252 Broadway
Chicago, Illinois

**CANADIAN DISTRIBUTOR**
Geo. F. Pettinos Ltd.
42 James St. South,
Hamilton, Ontario

**MANUFACTURED BY**

# BLASTCRETE EQUIPMENT CO., INC.

11154 Santa Monica Blvd. Phone: BRadshaw 2-3632 Los Angeles 25

# WHICH FOUNDRY POURS MORE METAL?

*300 molds on their way to the shake-out at Otis Elevator, Yonkers, N. Y. MODERN cranes, monorail, pouring devices and ladles are synchronized for fast, high-production pouring.*

*Model "E" Pouring Devices, 14" covered, tapered ladles, 19" distributing ladle and four, trolley type cranes pour 8 tons of gray iron, per hour, at Barclay Foundry, Milwaukee. Castings are supplied to machine tool builders and auto manufacturers.*

## Both Foundries are MODERN EQUIPPED!

and on a man-per-hour basis both foundries are pouring approximately the same volume of metal.

At the large Otis Elevator foundry, Yonkers, New York the MODERN Pouring Devices operate on MODERN trolley type cranes. Molds, when poured, move on roller conveyors to the shake-out.

At the smaller, Barclay Foundry, Milwaukee, two tons of metal, per man hour are poured with each Pouring Device.

Both foundries are saving the MODERN way — SAVING time . . . SAVING manpower and SAVING every possible pound of pay-metal.

Working hand in hand with practical foundrymen, MODERN engineers have proved, in more than 30 years of service, numerous types of charging, melting and pouring systems for ferrous and non-ferrous foundries — LARGE AND SMALL! We'd like to plan with you, too.

If your problem calls for much special engineering, write it up for a full and free discussion by our lay-out engineers. If you already know your requirements the coupon can be used for obtaining the standard, FREE literature . . .

MODERN

**MODERN EQUIPMENT COMPANY**
**Port Washington, Wisconsin**

F2-52-IP

**MODERN EQUIPMENT CO. DEPT. F-4, Port Washington, Wisconsin**

Mail to my attention:
Catalogs on metal pouring systems and ladles ..... ☐
Cupolas and cupola chargers, catalog 147-A ..... ☐
Cranes and Monorail systems, catalog 150 ..... ☐
More information on FREE use of MODERN, color, sound films .... ☐

Company .....

Street ..... Zone .....

City ..... State .....

# Ever hear of a FOUNDRY SUPPLY SUPERMARKET?

This typical Foundry has . . . and they know that it's Frederic B. Stevens, Incorporated.

Stevens offers a complete one-source service for supplies, equipment and methods. Facings are manufactured in Stevens' own mill, where only uniform raw materials are used. This means uniform products that give uniform results!

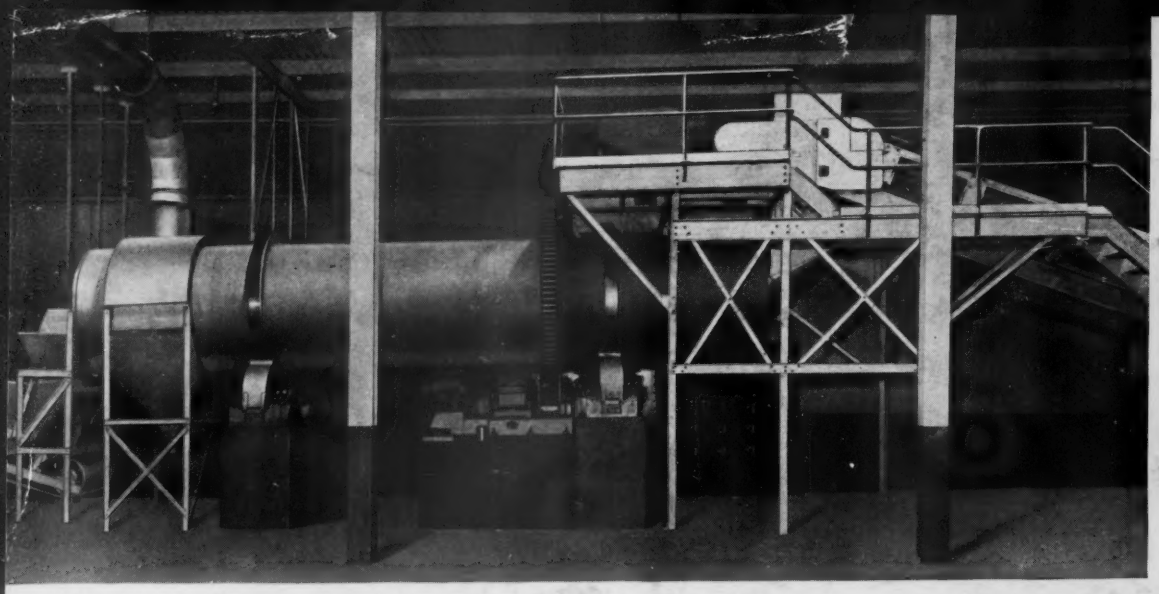
Stevens carries on a program of continuous research, development and control. Our laboratories are constantly seeking new ways to bring you better casting results at the lowest possible costs.

When you deal with Stevens you are assured of prompt shipment—highest quality materials—and complete technical assistance for almost any problem you might have.

See your nearest Stevens representative today, or write us direct. FREDERIC B. STEVENS, INC., Detroit 16, Mich.

FREDERIC B.
STEVENS
INCORPORATED
EVERYTHING FOR A FOUNDRY
DETROIT 16, MICHIGAN

*BRANCHES:* BUFFALO • CLEVELAND • INDIANAPOLIS • NEW HAVEN
*IN CANADA:* FREDERIC B. STEVENS OF CANADA, LTD., TORONTO • WINDSOR

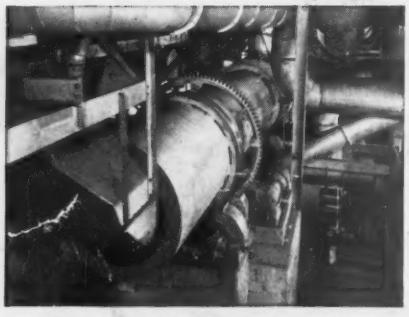


*Above:* Side View of Continuous Sprue Mill Showing Inclined Apron Feeder and Belt Conveyor Handling Cleaned Sprue to Yard Storage. *At the right:* Discharge End of Soft Iron Sprue Mill.

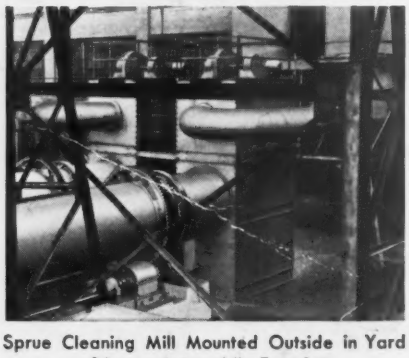
# Our customers report that installing . . .

# Sprue Mills

## . . . pays big Dividends



Feed End of Hard Iron Sprue Mill in Knockout House of Large Automotive Foundry.



Sprue Cleaning Mill Mounted Outside in Yard of Large Automobile Foundry.

***"Direct Savings Associated With Sprue Cleaning Paid for the Installation in Less Than 6 Months"***

● Charging cleaned sprue into a cupola reduces the stone additives in some cases from 4% to less than 1½%, resulting in less coke consumption — faster melting — less slag to handle — reduced deteriorization to cupola linings. Cores from the knockout can be processed with the sprue to break lumps. This makes handling and disposal of waste sand easier and releases rods, gaggers and arbors for picking. Let us show you how profitable a completely mechanized sprue cleaning and waste sand handling installation can be.

DESIGNERS

ENGINEERS

**BARTLETT-SNOW**

CLEVELAND 5, OHIO

FABRICATORS

ERECTORS

*Foundrymen Who Know — Buy Bartlett-Snow*